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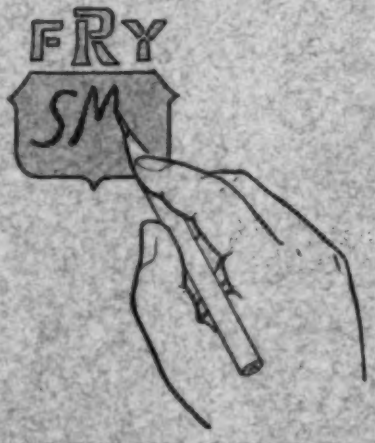

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SANITARY DISTRICTS IN THE ANALYSIS OF MUNICIPAL MORTALITY AND MORBIDITY DATA.

PROF. ROBERT E. CHADDOCK,
Columbia University.

Read before the Vital Statistics Section of the American Public Health Association, Rochester, N. Y., September 10, 1915.

PART I. THE ARGUMENT FOR SANITARY DISTRICTS.

THE *object of the health movement, stated in briefest phrase, is to lengthen and strengthen human life.* To clear the way for effective action, the factors which cut short or weaken the lives of men, women or children must be carefully analyzed and must be clearly understood. If the urban environment, the industrial changes, the coming of various foreign peoples bring new dangers to health and safety, these should become the objects of investigation.

Health and safety have not been fundamental considerations in locating or building our cities. Bad housing, dangerous working conditions, inadequate sanitation, have cost thousands of lives each year, but the flow of population has not been turned back from the city. It is the function of the health movement to make the modern city more than a labor market and a place of business—a healthy and comfortable place in which to live as well as to work. To accomplish this aim, more exact data should be recorded concerning the effects of the urban environment in its various aspects. Every addition to our knowledge reveals the lack of proper adjustment, the existence of selfish exploitation and the absence of coöperation for the common welfare.

THE CITY A HEALTH LABORATORY.

There is a sense in which the city may serve as a health laboratory. It is impossible to control people and environment as the natural scientist controls the substances with which he experiments in his laboratory. Nevertheless, it is possible to investigate the variety of conditions that affect health and safety, to modify or control the factors which seem responsible for bad results and to observe the effects of these changes upon the mortality and sickness of the community.

The health movement involves scientific investigation and experiment in a broader sense than standard tests

in laboratories for milk and water or for the detection of disease. Before the health official is spread the great variety of factors which, in the modern city, affect, in varying degree, the welfare of the people. Many nationalities live under different conditions of housing and sanitation. Various occupations show different degrees of risk to health and safety. Housing and sanitary conditions vary from the worst to the best. Records of death, sickness and injury furnish the health department with an excellent measure of the varying influence of these different factors. Records of the physical examination of school children furnish evidence for or against the environmental and hereditary influences to which they have been subjected.

Work of Health Officials Should Be Guided by Vital Statistics.

The health departments of our American cities have scarcely begun to utilize their vital statistics. Therefore, it is not strange that the unit of area covered in the analysis of these records has not received adequate consideration. It is recognized in sanitary science that vital statistics, properly analyzed, furnish the guide to the discovery of bad conditions and their causes. Again, the success or failure of a remedy devised by the sanitarian is tested by a new record of the facts.

It is for the more effective use of vital statistics in assisting health practice and administration that this paper pleads. The health budget of our large cities involves the expenditure of millions of dollars each year. Therefore, in the interest of maximum results in lives saved and strengthened, it is important that the health officials possess exact knowledge of mortality and morbidity in every part of their field of activity. Effort and expenditure may then be directed to the places where the need is greatest, and where the largest results are likely to be achieved.

No effort will be made in this paper to emphasize the short-comings of municipal vital statistics in the United States in reference to the details of the analysis, by age grouping, race, occupation, cause of death, etc. These detailed criticisms and comparisons with foreign practice are carefully presented in a paper, familiar to you, by Dr. Frederick L. Hoffman, before the 15th International Congress on Hygiene and Demography, at Washington, in 1912 (Transactions, Vol. 6, pp. 113–130). The situation is not essentially different at the present time. *The area of analysis is our chief concern in the present discussion. In most American cities it is too inclusive.* Vital facts are tabulated and summarized by political or administrative divisions, the borough, ward or assembly district. Crude death-rates are presented for an entire borough or at best by separate wards. Sickness data are rarely analyzed at all. The area of analysis includes, in most cases, conditions that are too dissimilar. Both good and bad housing and sanitary conditions are found within the given area. Different occupations are carried on in different parts of the district and several nationalities make up the aggregate

population. In one part of the area health conditions may be very good, in another part the conditions may be very bad. To calculate a mortality or morbidity rate per 1,000 of the entire population of the ward or borough shows nothing that is true. *It represents neither good nor bad health conditions accurately. It conceals the worst conditions through the inclusion of the best and thus deceives, at least the public.* Such a rate is of no value for practical use by the sanitary authorities. The wide variations in mortality, in different parts of such an area, *i. e.*, a ward of New York City, will be given in detail later in this paper. A policy of efficiency demands accurate information which will not conceal the true health situation in any part of the city. The facts are needed to arouse public opinion to support health policies in specific areas. *For an accurate understanding of causes of death and illness, which is preliminary to action for prevention, the vital facts are needed for narrower, more homogeneous areas.*

The unit for tabulation and analysis should be a sanitary area, with relatively homogeneous conditions. It should be *permanent* in order that frequent comparisons may reveal changes in health facts in relation to changes in population, sanitation, housing, occupation, intelligence, medical and preventive agencies, *etc.* It should be small enough to insure as much similarity as possible in the chief conditions which affect health, but should include enough population to render accurate for statistical purposes the rates of mortality and morbidity. The minimum number of people necessary for the calculation of a reliable death-rate, according to the categories of age, color, sex, nationality, cause, etc., which are considered essential, is a statistical problem for discussion in this meeting. This decision should govern the minimum size of the district.

The sort of analysis just suggested and the criticisms advanced by Doctor Hoffman, in the paper referred to above, really point to a function of the Bureau of Records very different from the present and much broader in scope. The records, up to the present time, have not been adequately utilized for scientific and practical purposes by the various health departments of the United States. *It means adding to the function of record the function of research*, but always keeping in mind the aim of the health officer—to throw light upon the causes of ill health—and always seeking to aid the official in accomplishing his aim and testing his success.

Some Specific Uses of the Sanitary Districts for Health Administration.

1. *The Study of Infant Mortality.*—The person who seeks to understand and control the causes of infant mortality and morbidity does not care to know the rate for an entire borough or ward. The possible factors are all too dissimilar in this area, and the favorable and unfavorable influences are hopelessly mingled. Where is the rate high, and, in this particular section of the city, what is the condition of the milk supply, how does the housing and sanitation com-

pare with other sections, what is to be learned concerning the intelligence and income of the families, the nationality and work of the mother, etc.? Knowing these facts for comparatively narrow areas and comparing them may show the causes at work to produce either a low or a high rate.

In the experimental stages of the location of milk stations, they were established where the need was great as estimated by a survey of the important factors unfavorable to the health of infants and where the rate of mortality was known to be high. The purer milk dispensed at the station, the instruction of the mothers at the station and in their homes, the medical care of the babies, and the improved sanitation as a result of the station's activity, reduced the number of infant deaths and prevented sickness. The vital facts of this little community showed the milk station to be a successful experiment. The intimate knowledge of the factors unfavorable to the health of infants in that part of the city should become a valuable asset in the campaign of prevention. Each new record of the vital facts measures the progress of the movement. If the rate is calculated for the entire ward or borough, the establishment of milk stations will result in a reduced rate, and yet some very bad conditions in certain parts of the ward may be concealed by the very good conditions in other sections. To average results over wide areas with heterogeneous conditions is always dangerous and likely to mislead.

The calculation of an infant mortality rate over smaller areas involves the tabulation of births in these same areas. This record would facilitate a study of variations in the birth-rate and their significance.

2. *The Study of Specific Causes of Death and Sickness or Disability.*—The mortality or morbidity rate from tuberculosis for a borough or a ward of a city is not significant to the investigator of causes or to the health department whose business is to prevent. It is important information if a high rate in a certain section be found associated with bad housing, dangerous occupations, or inadequate facilities for the care and supervision of advanced cases. In this case, also, if rates are calculated for too wide an area, the conditions most dangerous may be partially concealed by the showing of the best sections. Although it is recognized that tuberculosis is an occupational disease, our city health departments, in their published reports, throw no light on the relation of deaths to occupation. The mass of morbidity data recorded in hospitals and in tuberculosis clinics concerning the victims of this disease is not analyzed, as a rule, with a view to showing the relation to living or working conditions or to nationality or race.

3. *The Relation of Housing to Health.*—It would be readily admitted by all that the type of dwelling and the number of occupants have a very close relation to health. In construction, ventilation, sunlight and sanitation are fundamental; in use, the number of persons per room and their intelligence and habits are important. The health departments in

the United States have practically no data concerning the relation of room-overcrowding to health. The experience of European cities, where such data are recorded and analyzed—for instance, the city of London or the city of Leipzig—shows an increasing death-rate with the increase of the proportion of overcrowded dwellings. This is especially true of infant deaths and consumption. The report of the special housing committee of the Boston-1915 movement,—issued in 1910 (p. 18)—attributed much disease and mortality to the congestion of the North and West Ends, where the rates were higher than elsewhere. The problem of measuring the effect of housing on health is difficult because of the many other factors involved, but an intensive study over comparatively narrow areas and the comparison of these results would probably yield valuable information which would furnish strong support for a movement for city planning and for stricter building regulations.

4. *The Control of Contagious Diseases.*—Isolation in special hospitals and by quarantine in the homes are the two methods employed to control contagious diseases. The mortality or morbidity rate for scarlet fever, calculated for the entire city or a borough, does not give the health official complete information as to the situation. The larger area may make a favorable showing and yet there may exist serious need for another contagious disease hospital more accessible to certain sections. To bring out this need, analysis of the facts concerning contagious diseases should be made over narrower areas. In some sections of the city the population may be so dense that quarantine in the homes is very ineffective. This becomes a peril to the health of the entire city. Such danger spots should be detected, and, if necessary, the hospital must be employed for isolation. To bring out the significance of variations in the contagious disease rate analysis for narrower areas would prove very helpful.

5. *The Study of Vital Facts According to Nationality or Race.*—It is of the utmost importance to measure the effects of the new environment upon the health of immigrants, or the effects of the urban life upon the health of the colored people as they flock to the cities, both North and South. It is not enough to calculate the death-rate from tuberculosis for Negroes, Italians or Jews in the entire city. They may be susceptible to the disease or comparatively immune from it because of conditions from which they have come or because of racial characteristics. On the other hand, they may be affected by the new surroundings—where and how they live, what occupation they follow, their ignorance, and their changed habits and manner of life. Different mortality and sickness rates should be analyzed in connection with the varying environmental influences. Some of the differences in health attributed to race may be accounted for by the environment—a factor more capable of modification in the campaign to improve health.

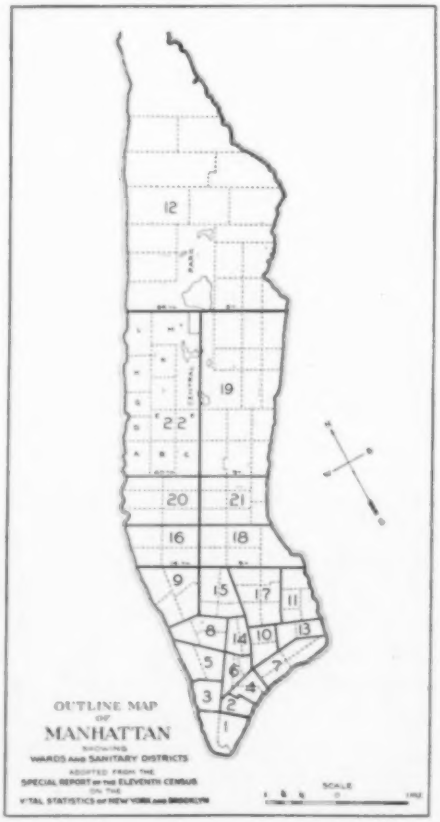
The need for more intensive study over smaller areas of the facts concern-

ing sickness, disability and death has become imperative for the health departments, especially of the larger cities where conditions are so complex. With knowledge and efficiency, effort and funds may be concentrated where they are most needed and where they will yield the largest returns.

Part II. What Has Been Done in the United States Toward Establishing Such Sanitary Districts.

1. *Work of Dr. John S. Billings at the Eleventh Census, 1890.*—Under the direction of Doctor Billings, who was in charge of the Vital Statistics of the Eleventh Census, several special reports were issued, presenting detailed studies of the vital facts of some of the larger cities. These reports included features which were new in census work. The most interesting departure from former practice was the subdivision of these cities into *sanitary districts* and the analysis of the vital facts in relation to the immediate surroundings, among different races and classes of people.

Taking the older city of New York (Manhattan and Bronx boroughs) as an illustration, the twenty-four wards were subdivided into 114 districts, varying in size from 23 acres in the downtown section to 8,474 acres in the sparsely settled Bronx, and in population varying from less than a thousand to over fifty thousand (see map). The boundaries of the districts were fixed with the advice of the local health and police authorities, and "with reference to topographical features and character of habitation and of residents." For the calculation of mortality rates the mean population for the six-year period, ending May 31, 1890, was used as a base, and the deaths were compiled from physicians' certificates filed with the health department during the same period. Rates were calculated for each sanitary district, for the entire population, and according to color, nativity, and limited age grouping (under 5 years), and for certain important causes of death, *i. e.*, diarrheal diseases, consumption, typhoid fever, *etc.*



Maps were made of the city showing, by degrees of intensity of the shading, the variations in these rates among the various districts. There was included in the report, with the mortality facts, a somewhat detailed description of each sanitary district, setting forth area, number of dwellings, persons living per acre per dwelling and per family, together with a brief account of the character of the population and the uses to which the land was devoted, whether for residence, business or park space. The death-rates were calculated for the two age groups, under 15 years and 15 years and over, according to the birthplace of the mother, in the effort to show variations in the influence of heredity as derived from the mother. Comparisons were drawn between the significant rates for the specific district and for the city as a whole.

The following table, compiled from the special report of the Eleventh Census on the Vital Statistics of New York and Brooklyn, will show the need of narrower areas than ward units for the analysis of mortality data, and, at the same time, will suggest some of the difficulties involved in working out sanitary districts. The sanitary districts of a single ward, the twenty-second, in Manhattan, are shown.

TABLE I.

MEAN ANNUAL DEATH-RATES, INCLUDING STILLBIRTHS, FOR THE SIX-YEAR PERIOD ENDING MAY 31, 1890, FOR SPECIFIC AREAS OF THE TWENTY-SECOND WARD, MANHATTAN.

Ward or sanitary district.	Size of district in acres.	Population of district in 1890.	Population of district under 5 years, 1890.	Death-rate of entire population per 1,000.	Death-rate of whites under 5 years of age per 1,000.	Death-rate from diarrheal diseases per 100,000.	Death-rate from typhoid per 100,000.	Death-rate from consumption per 100,000.
Ward 22	1,480	153,877	16,110	26.03	*	274.67	18.37	319.52
A.....	116	22,586	3,027	35.15	137.14	395.72	24.38	408.72
B.....	104	34,307	3,697	29.66	133.20	296.89	14.98	360.02
C.....	104	14,262	697	24.05	164.82	147.98	21.88	276.66
D.....	75	10,007	1,301	37.89	146.79	429.14	27.51	451.14
E.....	92	23,886	2,455	27.94	127.86	252.01	13.06	325.00
F.....	92	9,844	545	22.95	143.77	152.87	18.64	272.18
G.....	80	10,237	1,594	33.38	117.75	399.81	30.48	380.09
H.....	116	6,457	924	25.07	96.74	329.70	11.37	216.01
I.....	90	10,467	1,069	21.15	114.40	187.62	12.27	210.42
K.....	94	4,853	258	9.23	61.97	49.16	15.13	49.16
L.....	147	2,343	227	23.65	103.56	180.14	15.66	203.63
M.....	370	4,628	316	10.47	70.27	79.31	11.90	103.10

* Not found in the Report.

A glance at the above table will reveal the wide variations in the rates for various parts of the same ward. The rates for the entire ward do not measure conditions with sufficient exactness for the purposes of the sanitarian, the health official, or the practical sociologist. In this ward were grouped together business and residence sections, the latter differing widely in the surroundings that affect health. Widely different conditions of housing and sanitation are associated with a heterogeneous population from the point of view of occupation, intelligence and nationality.

The Reliability of the Rates for the Sanitary Districts.

A reference to the table just presented shows that the total population of the different districts varies from two to thirty-four thousand, and that the number of children under 5 years of age varies from 227 to 3,697. The statistician at once raises the question as to *whether a reliable general death-rate can be calculated on a basis of 2,000 persons or a rate for children on a basis of 227*. Even if this point were settled in the affirmative, which would probably not be the case, *the serious question of comparability still remains between the various rates calculated for the different districts on such widely varying bases*. Not only is it a question whether the rate under 5 years, for district L, is a reliable rate at all, but is it comparable in reliability to the rate for district B with over sixteen times as many children? Are the general rates for the same two districts comparable when a similar disparity in total population exists? In answering these questions it will be desirable to know the actual number of deaths annually in the various districts.

The population facts in Table I are for June 1, 1890, while the mortality data in Table II are averages for a six-year period, ending May 31, 1890. The Special Report does not publish the mean population for the six-year period, from which the rates of Table I were actually calculated. The rates

TABLE II.

Average Annual Number of Deaths,* Including Stillbirths, for the Six-Year Period, Ending May 31, 1890, in Sanitary Areas, Twenty-Second Ward, Manhattan.

Ward or District.	Deaths from all causes.	Deaths under 5 years.	Deaths from diarrhœal diseases.	Deaths from typhoid.	Deaths from consumption.
Ward 22	3,637	1,788	384	26	446
A.....	671	359	81	5	84
B.....	861	426	93	4	112
C.....	290	99	19	3	36
D.....	321	166	39	2	41
E.....	565	272	55	3	71
F.....	191	68	14	2	24
G.....	289	162	37	3	35
H.....	136	77	19	1	13
I.....	187	106	18	1	20
K.....	38	14	2	1	2
L.....	47	20	4	.5	4
M.....	41	19	3	.5	4

* The total deaths for six years are given in the special report of the Eleventh Census for New York and Brooklyn. To calculate average annual deaths the totals were divided by six. The result is in integers and less reliable where small numbers of deaths are involved.

in the following Table III are calculated for the purpose of illustrating the relative reliability of the rates of the different districts, using the population of 1890 and the average annual deaths for the six-year period preceding, as found in Tables I and II. It is clear that the resulting rates are not the actual rates of Table I. Now, observe the changes in the rates produced by a variation of one death in districts L and B, the two districts with the extremes of population and number of deaths, both at all ages and under five years.

As shown by the calculations of Table III, a variation of a single death does not affect at all the general death-rate of the more populous district B but it causes a difference of .4 in the case of district L. A variation of one death under 5 years causes a difference of only .2 in the death-rate for children in district B, but changes the rate for children in L to the extent of 4.4 per 1,000. It would appear, from these calculations, that death-rates based on too small a population in the district are not reliable to the same degree as if based upon a larger number, because they are more affected by chance fluctuations. A rate under 5 years, based upon 227 in that age group, if it be a death-rate at all, does not appear comparable with a rate in another district based upon 3,697 children under 5 years. A glance at other columns of Table II will emphasize still more serious difficulties, if various causes of death be examined according to sex, color and age, in a district having a population as small as district L, or even considerably larger. The number of deaths and the population base in each category become so small that the resulting rates are unreliable and entirely incomparable with the same sort of rates for more populous districts. A great change in the rate may be due to a variation of only a very few actual deaths, which has no particular relation to surrounding conditions, or to the character of the population. *Rates calculated upon too small a base are likely to mislead, therefore, just as surely as do the rates over too wide an area, such as the ward or borough.*

TABLE III.

COMPARISON OF DEATH-RATES IN DISTRICTS L AND B, AT ALL AGES AND UNDER FIVE YEARS, WHEN AN ARBITRARY VARIATION OF ONE DEATH IN EACH DISTRICT IS INTRODUCED.

General rate at all ages.	*Rate per 1,000, District L.*	*Rate per 1,000, District B.*
General death-rate, using data in Tables I and II	17.5	25.1
General death-rate, after subtracting *one* from deaths of each district, as in Table II	17.1	25.1
Difference	.4	0
Rate under 5 years.		
Death-rate under 5 years, using data Tables I and II	88.1	115.2
Death-rate under 5 years, after subtracting *one* from deaths under 5 years in each district	83.7	115.6
Difference	4.4	.2

2. *Work of the New York Federation of Churches and the Federal Census Bureau at the Thirteenth Census and since that Time.*—In 1906, the New

York Federation of Churches, through its Population Research Bureau, started a movement to induce the Federal Census Bureau to give the population of the city, at the approaching Census, a neighborhood tabulation. The Census authorities agreed to tabulate all the population data for New York by tracts, as suggested and approved by the Federation. The Greater City was divided into 707 districts, measured by planimeter and verified by the city authorities, which were certified to the Federal Census authorities by the Federation. After the enumeration had been made in 1910 by the Census Bureau,* lack of funds prevented the preparation and publication of the results of the tabulation by small tracts. The Census Bureau published the facts for assembly districts, a unit entirely unsuited both for the purposes of the Federation and for the analysis of health data. Therefore, in this emergency, the New York Federation of Churches assumed the expenses of the preparation and publication of the data by the small tracts.

Their purpose, as stated by their Secretary, Dr. Walter Laidlaw, who edited the volumes containing the population facts, was "a statistical basis for demographic studies of Greater New York *to guide the location of churches, settlements, hospitals, recreation centres and all other forms of voluntary welfare work, as well as to guide the location of schools, playgrounds, markets, water and sewerage disposition centres and methods.*" It will be observed that no specific mention is made of the health department and the analysis of its statistics.

The area of these tracts ranges from 40 acres average, in the populous districts, to square mile multiples in the sparsely settled sections. In Manhattan and Bronx, *the population of the different tracts varies from less than a thousand in some of the downtown business districts to 45,000 in the crowded East Side.* There are a large number of districts with less than five thousand. These extremes of population are quite similar to the differences found in the tracts used by Doctor Billings.

As published, the population data include *age grouping for each district in divisions, 1–5 years; 6–9, 10–14, 15–17, 18–20; over 20; sex, color, nativity and parent nativity, number of families, number of dwellings, persons per acre, families per dwelling, persons per dwelling, illiteracy, and year of immigration of foreign born whites.*† It will be observed that the age grouping adopted is not adequate for the analysis of mortality data. The first group includes up to six years, the legal school age, a grouping that is not in common use in health statistics. There is no subdivision after 20 years.

New York City Health Department, Division of Vital Statistics, Adopts These Districts for Analysis of the 1915 Mortality and Birth Statistics.

Recognizing the ward unit as unsuited for the analysis of vital facts, the Registrar, Dr. Wm. H. Guilfoy,

*Tract enumerations were also made in Boston, Philadelphia, Baltimore, Pittsburgh, Cleveland, Chicago and St. Louis.

†See Statistical Sources for Demographic Studies of Greater New York, 1910, New York Federation of Churches, 2 vols.

has decided to use the areas marked out by the Federation of Churches, with their population facts, as enumerated in 1910, as the basis for mortality rates for the year 1915. The following table, compiled from the Federation's Volume I and from the unpublished sheets of the Division of Vital Statistics of New York City Health Department, will be of interest. The same part of the city, the twenty-second ward, the facts for which were presented in Tables I–III, is covered in the table below, according to new tracts, which do not coincide with those used by Doctor Billings, in their individual boundaries.

A glance at this table will show the wide variations in the rates, which suggests conditions that should not be grouped together in a ward rate. But we observe the wide variations in the number of people living in various districts, and in the number of children from 1 to 5 years of age. We are led, therefore, to *question the reliability of the rates in themselves*

TABLE IV.

MORTALITY RATES FOR FIRST QUARTER, 1915, BY SANITARY DISTRICTS OF THE TWENTY-SECOND WARD, MANHATTAN, ACCORDING TO POPULATION OF 1910.

District number.	Total population in 1910.	Children 1–5 years in 1910.	General death-rate per 1,000 of 1910 population.	Death-rate 1–5 years per 1,000 of that age in 1910.	Rate for pulmonary tuberculosis per 1000 of 1910 population.
89	12,836	1,127	20.23	50.4	2.5
91	8,405	1,128	23.17	28.8	8.7
95	15,778	1,665	14.40	24.3	3.3
97	11,354	1,655	20.02	41.7	3.9
101	13,806	1,439	32.04	73.3	5.9
103	7,727	1,129	26.26	57.5	4.2
107	11,939	1,055	26.17	46.1	4.4
109	4,305	599	26.39	74.5	2.8
*113	7,533	1,224	38.09	72.9	2.7
*115	8,037	998	36.86	113.9	5.1
117	8,627	634	19.75	19.2	2.4
119	4,814	579	25.29	35.0	4.2
121	6,305	294	19.30	41.4	1.9
123	11,688	1,697	18.06	43.0	3.1
125	5,974	193	14.29	42.1	none
127	4,184	119	13.58	none	1.0
129	5,568	214	13.12	none	.7
131	3,466	147	12.88	27.6	none
133	4,914	179	18.99	45.3	1.6
135	5,267	293	13.10	13.8	none
137	8,672	463	13.57	26.3	none
139	6,957	355	10.49	none	1.8

* Colored districts.

and for purposes of comparison, just as in the case of Doctor Billings' work in 1890. This area includes a great variety of housing and sanitary conditions, and extremes in the character of population. Comparisons, therefore, are of the greatest importance. It will be seen that district 127 had only 119 children, 1–5 years, while district 123 had 1,697 in this age group. Rates in these two districts are not equally reliable, as shown by the analysis in Table III. It is unnecessary to add to the calculations there presented.*

It will be observed that the divisions of this twenty-second ward in Table IV are more in number than in the case of those used in 1890. No district in Table IV has more than 16,000 population, which is just half the number of the most populous district used by Doctor Billings. Therefore, the question as to the reliability of even the general death-rates for these districts, used in 1910, may rightly be questioned. In a discussion of this point, by the Advisory Committee of Statisticians for the Division of Vital Statistics of New York City, some months ago, it was agreed tentatively that a district should contain at least 25,000 population, in order that its mortality rates, when calculated for various categories of age, sex, color, cause of death, etc., should be thoroughly reliable.† These are technical problems which this meeting should discuss in greater detail.

These districts, determined by the Federation of Churches, were not primarily intended for the analysis of vital statistics, but they do constitute a step in the direction of tabulating our population data in such a manner as to make possible a more accurate understanding of the relation between health and welfare and the surrounding environment and the character and activities of the population. It may be necessary to make other combinations of these smaller units into larger, for the uses of the Health Department, Division of Vital Statistics, in order to secure reliable rates of mortality; but the value of the work already achieved, which is briefly described in this paper, remains. It is hoped that federal and state census authorities may coöperate in the future to furnish population data for these narrower areas every five years, for the larger cities of the country, and that the health authorities in many cities may realize the advantages of using these same areas for the tabulation of their vital facts. Thus sanitary areas of a permanent character would be established for the collection and record of a great variety of information, much of which, when properly related to mortality and sickness data, would greatly aid the active work of health officials.

*In the first quarter of 1915, if one be subtracted arbitrarily from the deaths 1–5 years of age in district 123 where the children number 1,697, the death-rate for this age group *will be changed only .6;* but if one be subtracted from the deaths 1–5 years of age in district 131, where there are only 147 children, *it will change the death-rate 6.8 per 1,000. The rate in the one district is much more subject to chance variation than in the other.*

†The experience of the New York City Department of Health, in the analysis of the mortality data for 1915, has led to the decision to combine the smaller areas in such a manner as to secure a population of about 40,000 as a basis for mortality rates.

Discussion.

SHIRLEY WYNNE, M. C., *Assistant Registrar, New York City Health Department.*

Doctor Chaddock has ably presented all the arguments in favor of smaller health districts, and I think that those of us engaged in health work in the large cities are convinced of their need. The details of the plan, however, are not as yet satisfactorily settled upon, and discussion of such points as the size of the proposed districts is desirable.

As the result of our experience of six months with health districts, we feel that the districts should have a population of between 40,000 and 50,000 inhabitants in order to avoid fluctuation due solely to paucity of data. In many parts of the city this has necessitated joining two or more of the forty-acre tracts. Care, however, was exercised to maintain the characteristics of the districts brought together by combining only such districts as were alike in the nationality of the inhabitants, alike in housing, alike in sanitary, social, and economic conditions. In a few districts, conditions were found that seemed to warrant maintaining them as separate districts even though their population was very small. For example: the third district, which contains the only Syrian colony in the city, and the fifteenth, in which Chinatown is located, the only Chinese district in the city.

Our experience also leads us to feel that even with health districts containing 40,000 or 50,000 inhabitants, the quarterly and even the semi-annual rates will be of little value as a basis for departmental action having for its object the permanent reduction of the death-rate. Of course, epidemics can be immediately detected in districts of any size, but in attacking the social and economic conditions exerting an influence on mortality, only the analysis of yearly figures will indicate their nature and their remedy. In studying the figures in one of the negro sections for the first quarter of the year, it was found that the death-rate of the colored population was practically twice that of the white population, which was in accord with our accepted theories of the mortality figure. The following quarter, however, the figures were reversed; that of the white population being twice that of the negro.

One of the first things that appealed to us was the desirability of computing infant death-rates on the births occurring in each district. This necessitated redistributing the births that occur in the maternity hospitals according to the district in which the mother lived at the time of admission to the hospital. It, of course, would be unfair to credit all the births occurring in a maternity hospital to the district in which the hospital was located. It is also evident that a larger percentage of persons from the poor district will seek hospital care during confinement than from a district in which live those that are blessed with the good things of life. The deaths reported from institutions must, of course, be redistributed. This has been done in New York City for many years.

Briefly then, our conclusions based upon a short experience of six months are:

First, the basis of division should be one of area and not one of population.

Second, the districts should be as large in population as possible without sacrificing the homogeneity of the districts.

Third, under no circumstances should the homogeneity of the district be sacrificed, no matter how small the resultant districts may be.

Fourth, only yearly figures will be of value in discovering and attacking social and economic conditions affecting mortality.

Fifth, births and deaths occurring in hospitals must be redistributed.

Sixth, preventable diseases should be tabulated according to sanitary areas, and morbidity and mortality rates computed for each disease in each district.

SOCIAL ASPECTS OF INDUSTRIAL HYGIENE.

By Donald B. Armstrong, M. D.,
Director Department of Social Welfare, New York Association for Improving the Condition of the Poor.

Read before the Industrial Hygiene Section, American Public Health Association, Rochester, N. Y., September 10, 1915.

The Journal has already published a paper by Doctor Armstrong on the Social Aspects of School Hygiene. It is therefore a pleasure to present this article dealing with similar features in industrial life.

THE modern Christian religionist, if he is willing at all to violate the fundamental principle of resisting not evil, to the extent of leaving for the time being constructive work for the purpose of testifying *against* something, will be found associated with those who are opposing *social* evils. This is in distinct contrast to the strictly individualistic "personal salvation" methods of a generation ago or of those theologians who, representing exhausted theories, have not yet had time to die off. Our sins of today are *social* sins, such as child labor, prostitution, the prevalence of tuberculosis in industry, etc., rather than the much simpler and more convenient (for the preacher) sins of a few decades ago, such as gambling, Sabbath breaking, etc.

In the same way, when one looks at the problem of public health in general, or perhaps in particular of industrial health, in a broader sense, it must be realized that the physical and mental ills that seemingly in an isolated way affect the individuals under observation, are also in reality evidence of *social* defect. They are, for the most part, social diseases to be controlled by social instruments. Lead poisoning in a white lead works is directly, so far as the individual is concerned, the result of a lead-impregnated system; on the other hand and indeed more fundamental, the existence of lead poisoning in a group of factory workers is indicative of such predisposing factors as defective social organization in the industry, lack of a preventive sense of social responsibility on the part of the employer or director, and a deficiency of social control by the state over the working environment of its citizens. Health defects are for the most part a manifestation of social disease to be controlled by social instruments. Eventually most, if not all disease, including industrial disease, will probably be looked upon as a social defect and in this broad sense, therefore, all preventive medical or constructive health work is of profound social significance.

To turn to the consideration and practical interpretation from a social and economic point of view, of certain phases of health, and particularly of industrial hygiene work, one does not

have to search far for illustrative material. Before proceeding with the general theme, however, one or two more or less haphazard observations may lend emphasis to the argument for a social interpretation of modern industrial phenomena. Perhaps with no special justification, one thinks almost first of the relationship of women to industry in modern times and of the increasing complications and responsibilities in this field. The modern factory system, having grown out of handicraft production, and the more primitive domestic production, has brought with it many serious problems, the least important of which is by no means the question of female industrial labor. Leaving out of consideration the extreme conditions in our southern states and considering jointly for the time being the questions of woman and child labor, it is interesting to note that in Rhode Island, a typical northern industrial community, the 1910 statistics disclose a surprisingly large number of women and children in industry. Of the total industrial population over 16 years of age, 36,000 or 32 per cent., were women, incidentally, as regards this particular factor, the highest percentage in the United States. There were in that year 5,000 children under 16 years of age working in Rhode Island, 4 per cent. of the total industrial army—the largest percentage in the United States with the exception of the child-labor-cursed southern states of North and South Carolina and Georgia. Unable adequately to protect themselves, especially susceptible to many forms of industrial disease, this portion of the industrial workers should make a specially urgent appeal for protection to the conscience of any community.

Another thing of social significance, to be mentioned now only in general terms, is the intimacy of relationship and the interdependency between home and factory conditions. It must be remembered that the average man in the United States is an industrial worker, having a family dependent for its health, education, progress and happiness, to a large extent at present, upon the man's working conditions. It is easy to understand the inevitable social and economic reactions between the work and the home. We must remember, also, certain very specific relationships such as the direct reaching of industrial disease itself through the worker into the home and to its members. Everyone is familiar with the symptomatic picture of lead poisoning—its anemia, discolored gums, paralysis, blindness, and insanity. This may be a picture of the male worker, poisoned with the metal. On the other hand, there have been many cases recorded where the disease has been acquired by the wife, even though her only contact with the lead industry was through the washing of her husband's lead-impregnated clothes, a poisoning preventable by the provision of factory dressing rooms and the insistence of a change of outer garments upon leaving the factory. Of far greater moment than this, however, though unfortunately less immediate and dramatic, are the economic and social home sequelæ of evil industrial conditions, such as incom-

petency, illiteracy, dependency, disease and crime.

There are many things to be realized in a complete consideration of the social aspects of industrial hygiene, only the seemingly more important of which can be touched upon here. Before considering the strictly social phases of the problem, however, there are certain closely allied factors of more immediate economic significance which ought, at least briefly, to be summarized.

1. The Economy of Prevention.

Before a section of the American Public Health Association it is assuredly unnecessary to say more than a word on this subject. In all phases of health work we have been preaching prevention rather than palliation, prophylaxis rather than cure, and it is gratifying to observe that those principles, motivated by economic rather than human considerations, are very effectively permeating the field of industry. Regardless of motive, all welfare work in factories, whether the result of kindliness, a desire for efficiency, the taste for philanthropy or the fear of higher wages and shorter working hours, would seem to be, subconsciously at least, a recognition of the economy of disease prevention in industry.

2. The Necessity for Human Conservation.

The American Association for Labor Legislation has estimated that there are about 33,500,000 industrial workers in the United States, and that they lose each year because of sickness, about 284,000,000 days. It is estimated that the total yearly financial loss, including wages, loss to industry and medical cost, is $772,857,000. This is not only a tremendous loss in efficiency, a great economic waste and an extremely poor conservation of human resources, but it is placing unnatural and unnecessary limitations upon the social and economic welfare of the most vital part of our national structure—the great mass of workers. It is conservatively estimated that at least one third of this disability is easily preventable. We are just now realizing that this prevention is not only possible but worth while.

3. The Value of Social Insurance.

Known to all are the substantial reductions in the number and severity of industrial diseases and accidents where, as in England and particularly in Germany, an adequate system of state insurance has been established. When the employers' insurance premium is rated according to the health hazards he maintains in his factory he is more than likely to see that those hazards are reduced to the minimum. Thus, insurance, besides lending security to those unfortunate individuals who succumb to unavoidable industrial accidents and disease, has a distinctly constructive, preventive influence on factory conditions and a consequent effect upon the human wastage in industry. Fortunately, in this country our state legislatures are moving forward from the field of employers' liability to the legislative realm of workmen's compensation. It is hoped that the legislators will

realize, as do all industrial hygienists, that the next urgent step in our comparatively backward industrial organization is the application to industry of the sickness insurance prophylactic.

On the distinctly social side of the question there are a number of points, many of which are generally applicable to all health work and a few of which are of special significance in industrial hygiene. Perhaps we can most briefly itemize them as follows:

(1) Causes Direct and Indirect.

In all health work, in anti-tuberculosis campaigns, in infant welfare agitations, in the elimination of physical and mental strain, fatigue and the neuroses of industry, it is essential that we be not blinded to the underlying, indirect economic and social factors in the etiology of our problem. In health work one finds without difficulty many questions which are on the surface apparently straightforward health and disease problems, and in connection with which, because of the imperativeness of the health aspects, those interested in their solution fail to recognize, and consequently do not attempt to deal with the underlying etiological factors, often of a distinct social and economic character. Such seems to be true, for instance, of much of our industrial hygiene work, perhaps particularly the attempt to control tuberculosis in industry. The workers are frequently concerned exclusively with the direct exciting causes, such as bad food, improper diets, lowered resistance, poor light and ventilation, filthy toilets, congestion, spitting, etc.

For the most part those interested, suffering from the almost inevitable myopia associated with close contact with the details of the problem, fail to see it in its entirety. They do not see the necessity for the correction of such predisposing factors as the inadequate family income, lack of adequate instruction regarding economic expenditures for and the proper use of foods, our unimaginative, individualistic, competitive system of industrial organization, the economic dependence of the mothers of the race, etc. In this problem there are very few directly causal conditions which are not traceable to these underlying factors. From them arise ignorance, poverty and unwise employment. To them may be traced bad housing, insanitation and crime; alcoholism, disease, bad feeding and exposure. Poverty, ignorance and destitution are frequent factors in all kinds of ill health. Should ignorance be enlightened and destitution made impossible? Pretty far from industrial pathology? Yes and no! Far from the palliative treatment of this social disease, far perhaps from the *direct health treatment* of it, but very near the economic and social heart of the cure of the great socio-heath defects of which industrial disease is one.

(2) Suppression vs. Construction.

In great part the types of health work we have been used to in the past have been of an eliminative, suppressive character. In school hygiene, for instance, we first attempted to control

the communicable diseases. Of late, however, we have given much attention to the elimination of non-communicable defects and we are now emphasizing the use of prophylactic dental clinics, the physical training of normal, healthy children, the prevention of improper and insufficient feeding and the resultant malnutrition, by the establishment of lunches in the schools, etc. The same principle of constructive action is being applied to industrial hygiene. The old type of factory owner in the New York loft building is satisfied with a gas stove upon which the employees may boil some coffee at lunch time; on the other hand, the National Cash Register Company, for example, provides, in connection with a perfectly equipped lunch room, an adequate and beautifully furnished space for noon hour rest and recreation. The Standard Manufacturing Company of Pittsburgh not only provides shower baths, where industrial dusts may be washed off and industrial disease *suppressed*, but it adds to its equipment a beautiful bathing pool where health and resistance to industrial disease may be *constructed*. Thus modern constructive, creative health work presents a previously lacking social content. It indicates the realization of the social value of healthy individuals. It is attempting to lay a firmer physical foundation upon which the world may hope to see constructed a finer social state. It realizes that without a physically sound sub-strata, social evolution is bound to be abortive. It is from this point of view that health work is of very high significance when socially interpreted.

(3) *Education.*

Of course the very mechanism of practical health administration depends for its effectiveness entirely upon certain social instruments, the greatest of which is popular education. In industry, coöperation and sympathetic understanding have accomplished much. The educative method is undoubtedly fundamental to the spirit of democracy. Recently in New York City, in food sanitary work, for instance, the value of constructive educational methods over the usual system of non-instructive visits, prosecutions and fines has been amply demonstrated. The recently established Division of Industrial Hygiene of the Department of Health has fortunately followed the same educational tact. The furriers are being called together in groups by the Health Department officials and instructed as to methods of dust prevention and removal. To the laundry workers are issued educational leaflets describing the needs and methods of protection against soiled garments, the infection of open wounds, the sterilization of infectious material, etc. Such work is essential if industrial reform of a lasting character is to come from the bottom up. It is at least a necessary counterpart of such industrial superstructure reorganization as is involved for instance in a system of state insurance. Further, it is one of the ways of making the reporting of industrial disease actually effective, for with an understanding of the situation, the

demand for the report is going to come from the patient himself.

4. The Socialization of Industry.

For the most part the civilized world is reasonably democratic in its religious and political organization. The one great field, however, into which democracy has scarcely penetrated is that of industry. While we have almost everywhere else acquired the attitude of looking at any special problem from the evolutionary point of view, and while in many phases of life much progress toward the adoption of more socialized methods has taken place, on the other hand, in industry the old, more or less anarchistic individualism still prevails: The history of labor until recently has been individualistic, with a few notable variations. This is true of conditions both before and since the advent of capitalism and the factory system. Certainly capitalism and the great corporate developments of modern times are making necessary and indeed are paving the way for the next step in industrial evolution. This step would seem to be industrial socialization with greater power of state control, more direct social responsibility, and the organization of industry so that its perpetuation and survival will depend upon its value and fitness to society. However, ignoring for the present the possibilities in coöperation, communism, and the communistic anarchy of Kropatkin, the industrial world now would seem to be faced with two main channels for future developments. It is not at all certain that they are alternative channels: probably both tendencies will be influential factors in the ultimate socialization of industry. We have in mind, in the first place, the logical development of labor unionism into industrial unionism in industry with its proposed syndicalistic method of representation in politics; and in contrast to that the program of so-called "socialism," which involves state control over the great necessities of life, and the education of the people into the ideals of service to the state. These two tendencies carry rather distinct and somewhat contrasted programs, and while it may be a long time before we consciously choose one path or another, nevertheless there does seem to be indicated here the two chief forces striving to mold industrial evolution. They are attempts to answer the many questions that are being asked of organized society with ever increasing intensity. Is industry to be reorganized by the intelligent, coöperative sympathetic effort of a society with an awakened social consciousness, or is it to be seized and wrecked by the maddened and exploited? Is the spirit of gain to be replaced by the spirit of service or by the spirit of retaliation? Is class distinction to grow and class war to come, or are the classes themselves to be socialized into extinction? Shall it be the constructive evolutionary path or the destructive revolutionary one? Is the future industrial worker to be primarily a citizen serving "The Great State" or is he to be a member of a fixed labor class, first a worker and then a citizen, as embodied in the pitiable program of "I. W. W.-ism"

in industry and syndicalism in politics?

5. The Conscript Labor Army.

It is inevitable that part of the labor of the world must always continue to be comparatively uncreative and unimaginative. However, the ultimate cessation of immigration, more immediate impending events in the industrial world, point the way to the time, not far distant, when there will be no army of men always content to do "the dirty work" of the world. There is also a time coming when the state shall recognize the right of all individuals to work and grow socially and spiritually as well as materially—a thing scarcely possible for a man who is to be concerned with continuous drudgery or with one minute industrial process all his life. Is there a remedy for this condition? That is hard to tell, but there is a plan, outlined by William James, that calls for an industrial state in which no class shall toil unceasingly but, through a conscript labor army, everyone, man and woman, will have the preliminary years for education and development, will spend his allotted time doing the foundation work of the world under the direction of the state on a basis of service to all, and not for the financial gain of a few. All the big necessities of life such as transportation, mining, food distribution and production, etc., must come under government supervision. For the individual to work his allotted time in this great industrial army will be to perform a great and recognized service to the state. Thus may drudgery be regulated and rendered innocuous. Here may be at last a legitimate field for militarism.

6. The Alternation of Employment.

It should be realized that our industrial system involves not only a waste of money and men but also of energy and enthusiasm. The men in Rhode Island who are making pearl buttons and who have nothing but pearl buttons to look forward to for the rest of their lives are employed at a deadly, hope-killing occupation, and are quite naturally not going to put into that occupation any more interest and energy than is necessary. Is there a remedy for this? One has been suggested by an English writer and somewhat worked out by him in his discussion of the alternation of employments. This involves a periodic and progressive shifting from trade to trade, at least in allied industries, and requires of course intelligent governmental supervision, so necessary from every point of view, rather than the haphazard, anarchistic, industrial control or lack of control of today. This thinker believes, and certainly experience would seem to confirm it, that most men will work at a high pitch at a new thing, especially if they have in view a better thing to follow. In this way society would obtain both quantitatively and qualitatively a superior service from the individual, and as a result of the concentration would require less actual working time from the individual, thus allowing more time for the preliminary educational period, and, because of increased earning

capacity, a greater saving against the nonproductive old age.

7. The Ideal of Service.

Fundamental to future industrial development and to the inculcation of social methods in industry is that type of education which shall make it possible to supplant the spirit of gain by the spirit of service and which shall justify an industrial organization's existence on the grounds of its service to all rather than on a basis of its financial gain to the few. The government schools would seem, with logic, to be the ideal place to teach the spirit of service to the state and to society. Unfortunately, at the present time their value in this connection is almost entirely potential rather than actual. More effective channels and channels through which a great deal is being accomplished are the stage, pulpit and the novel. Perhaps we should call it inspirational teaching rather than education. It is a fundamental process and a very slow process. It would seem in reality to involve more or less of a change in human nature. But human nature has changed in the past and is changing now even though slowly. Industrial democracy is inevitable, even though its realization is not for the immediate future.

Conclusion.

What is the value of and the motive force for all the health work, in industry and out of it, that is now being undertaken? One can readily see that it has far-reaching social, economic and moral phases. Evidently it is an attempt to make sanitation universal, to eliminate preventable disease, to perfect the social and individual health status. It means increased human efficiency, greater earning capacity, a normal social life and a better physical foundation for sound, social and spiritual growth. It indicates that society is attempting to meet its social responsibility by protecting the whole of human kind from the menace of its defective members.

Is it done, however, purely for the sake of the physical and mental health which will result? Is a pig in a clean pig pen any less a pig? Is modern society striving for cleanliness, decency and health solely because they are worth while ends in themselves? Is the fullest meaning of constructive health work to be found in its social, political and ethical interpretation, or does it have an even more fundamental significance? Is it not true that a healthy individual and a healthy society are the only adequate means or instruments through which may come a more perfect expression of the conscious life in the universe? The public health is not only inevitably entangled in the problems of economic readjustment and of social growth, but it is of intimate significance to both individual and social spiritual evolution. The health of the people, the physical and mental welfare of the nation, and of the world, are essential to the higher manifestation of conscious life, the *Elan Vital*, striving for a more perfect expression through the medium of the human kind.

RURAL SANITATION: DEFINITION, FIELD, PRINCIPLES, METHODS, AND COSTS.

W. S. RANKIN, M. D.,
Secretary, North Carolina State Board of Health.

Read before the Public Health Administration Section, American Public Health Association, Rochester, N. Y., September 8, 1915.

In this rather brief paper, Doctor Rankin outlines the problem which was the subject of an interesting and important session of the meetings at Rochester.

DEFINITION.

THE word sanitation refers to civic life; the term rural sanitation refers to rural civic life; the constituted and the common organ through which rural civic life finds expression is the county government; therefore, we may define rural sanitation as the administration of sanitary measures by or through the county government. Rural sanitation finds its parallel in urban sanitation, and county sanitation its parallel in municipal sanitation.

FIELD.

The field of rural sanitation includes more than 99 per cent. of the area and more than half of the population of the United States.

PRINCIPLES.

No. 1. Rural sanitation should be initiated by the state, but executed through the rural civic machinery, the county government. The state should initiate, because the state is the only existing force that can initiate rural or county health work. The county government must carry on the rural sanitation initiated by the state for two reasons: First, should the states undertake to execute, as well as initiate, rural sanitary measures, all of the states, with a few exceptions, would soon realize that their undertaking was far beyond their means; second, no one, or no agency should do for others what they can do for themselves, as such practice leads toward dependence and indifference and away from independence and appreciation. The people are able, when properly shown, to care for themselves, and it is better for them to do this than to have it done for them.

No. 2. The independence of the county as a governmental unit demands a plan of rural health work that will permit the more progressive counties to go forward, liberating such counties from the possible retarding influence of the backward counties—in short, a plan that permits of leadership and healthy rivalry among counties.

No. 3. The multiplicity of rural governments is a great rural sanitary asset, affording a corresponding multiplicity of opportunity. There are 2,953 county governments in the United States, an average of 66 to the

state. The county governments of the average state hold over a thousand meetings a year; at practically all of these meetings the state's representatives are welcome and can get a hearing. If the state health officer has a reasonable proposition, with good argument behind it and not too big a budget in front of it, he can influence the county to take one, two, or three steps toward a cleaner civic life. Every meeting of the county government is a challenge to the state department of health to show the county its sanitary needs and how to meet them.

No. 4. Rural sanitation must be developed on a smaller budget than the budget for urban sanitation. The country is poor. What the exact difference between the urban and rural per capita wealth is in the United States, no one knows, but we do know that rural per capita wealth is much less than the urban per capita wealth.

No. 5. The influence of epidemicity is weaker in rural than in urban life, and rural quarantine measures need not be as rigid as urban quarantine measures.

No. 6. Rural sanitation will be influenced by the individualism of the country. The ruralite (a term more expressive than orthodox) is individualistic; the urbanite is communistic. The errors of individualism are best treated by education; the errors of communism are best treated by legislation; therefore, sanitary education is relatively more important in rural sanitation than in urban sanitation, while the reverse is true for sanitary legislation.

Methods.

There are two general methods by which a county may have sanitary measures carried out: First, the county may do its own work; second, the county may have its work done by some outside agency. The whole-time county health officer is usually regarded as the best solution by the first method, while the unit or contract system of county health work furnishes, probably, the best solution by the second method. With the general principles of the whole-time county health officer plan of work this section is familiar; therefore, I shall economize time by limiting my discussion to the less well known unit system plan of county health work.

The unit system of county health work assumes, first, the divisibility of county health problems into fairly independent units of health work; second, that a county may get better work for less money by paying the state board of health just what it costs to complete a certain piece of work than by attempting to do the work itself. Several illustrations will make the practicability of the unit system clear and perhaps better appreciated.

Illustration No. 1.—The North Carolina State Board of Health proposed to and contracted with ten counties for a county appropriation of $500 to administer free typhoid immunization to those citizens of the ten counties who wished to be immunized. In the first set of five counties we gave complete treatment to 26,537 people; when we complete the work in the next

five counties, 50,000 people in the ten counties will have been vaccinated against typhoid fever. This is about one-eighth of the population of the counties treated. In several counties about one-third of the population has been treated.

Illustration No. 2.—Our principal fall and winter work in rural sanitation will be executing contracts for the following unit of school work: For a county appropriation of $10 for each school in the county the State Board of Health agrees to arrange through the county school authorities and with the teachers a program of consecutive *health days* for each school as follows: Two weeks before health day the principal of the school receives from the State Board of Health a batch of hand bills announcing a date and program for health day. The hand bills also carry an invitation to the patrons of the school to attend the exercises. The teacher distributes these notices through the children to the school community. The representative of the State Board of Health arrives at the school at 10 a. m. on health day. He makes a fifteen-minute talk to the children and visitors on the importance of a knowledge of the laws of health. He then makes a medical inspection of the pupils and gives each defective child a card to its parents, notifying the parents of the nature of the defect and urging the parents to see the inspector after the evening exercises. The inspector mails a report of the inspection to the State Board of Health, which, through a system of followup letters, keeps in touch with the parents of the defective children until they are treated. The inspector then questions the children after the manner of the old-time spelling match on a health catechism, which has been supplied to the school in sufficient number at least one month prior to health day. The health day exercises then adjourn until 8 p. m., at which time the exercises are resumed. The evening exercises consist of from three to four short illustrated lectures by the inspector on the more important subjects of sanitation, interspersed with the reading of selected compositions by the school children. The last item on the program will be the awarding of prizes, the first for the best knowledge of the catechism and the second for the best composition. The inspector will grade, score-card manner, each school on the excellence of its showing, on health day. When this county unit is completed, a county prize will be awarded to that school giving the best coöperation in the work; a county prize will be awarded for the best composition, and another prize for the best knowledge of the health catechism. The inspector can handle one rural school a day. It will take two or three days to handle some of the larger village and town schools. In the first county to adopt this unit there are fifty-seven schools which will require a program of practically three months. The inspector will have very hard work for five days in the week, like all school workers, but like them will have Saturday and Sunday to rest. This unit of health work couples medical inspection of school children with the sanitary instructions of the entire community,

young and old alike—the young through the catechism, compositions, and lectures, and the old through the lectures, but most of all through the help the children will demand of their parents in learning the catechism, and in preparing the compositions.

This plan of contract county health work greatly increases the appropriation of the State Board of Health; an appropriation from a county is just as useful in doing health work as an appropriation from the state. This plan has great adaptability, and I might say extensibility in proportion to the ingenuity of the operator; under it a unit of infant hygiene work may be developed; under it a unit of anti-malaria work may be carried out; under it a unit of anti-pellagra work may be executed; under it many other more or less independent county health problems may be successfully attempted.

Comparative Value of Methods.—The whole-time county health officer idea proposes a means—an officer; the unit or contract system of county health work proposes an end—the execution of the plans and specifications for a definite piece of work.

The whole-time county health officer idea, if carried out by the county authorities, is subject to local politics; if administered under state supervision it is in conflict with the principle of local self-government. The unit system of county health work is not subject to local politics and does not conflict with the principles of local self-government.

The whole-time county health officer plan costs the county from $3,000 to $4,000 a year, and is available to only a comparatively few counties; the unit system of work costs the county from $500 to $2,000 a year, and is available to nearly all counties.

There are certain counties that should employ whole-time health officers, but the contract or unit system of county health work is better adapted to a variety of county conditions, and will be, in all probability, far more effective than the whole-time county health officer plan in reducing the state's death-rate. The unit system of county health work is important as a stepping stone to the whole-time county health officer. In leading up to the whole-time county health officer, the unit system standardizes county health work, so that, when a whole-time county health officer is employed, an effective plan of county health work will have been established.

Costs.

The unit system of work or proposed contract submitted by the average state to the county should not call for an appropriation of more than $1,000; $500 is better. The smaller the cost of the unit, the greater is the probability of securing the funds with which to *start* county health work. After one appropriation is obtained the responsibility is then largely with the state for making such use of it as to pave the way for easier and more liberal funds. The game of sanitation, like the game of life, to use the other fellow's grammar, "is not in holding a good hand but in playing a bad hand good." Even the novice can get results with plenty of money. The

intelligent health officer never loses sight of relative values, and the real fun of the game is in getting big results with little budgets. We shall be able to handle the county contagious disease problem for the average county for $300 to $400 per year. We will carry out the school unit for from $500 to $600 a year for the average county or for fifteen cents per pupil. We will have vaccinated 50,000 people in ten counties by September 11, for a cost to the counties of about ten cents for each person immunized.

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VENEREAL DISEASE CONTROL IN THE ORANGES.

FRANK J. OSBORNE,
Health Officer, Orange, N. J.

THE clinic for the treatment of genito-urinary diseases was established at the dispensary of the Orange Memorial Hospital, July 1, 1914, after a conference between the Health Department and representatives of the Dispensary Staff. This was the culmination of sentiment of long standing, started and developed by Dr. Daniel W. Poor of the Board of Health. The agreement was to the effect that the equipment and maintenance of the clinic should be provided for by the Health Department while the physicians and treatment, together with the room, should be furnished by the Hospital. The plan was to have two doctors in charge, one for the care of gonorrheal patients, the other for syphilitics; and while we realized the desirability of having clinics for both men and women we thought best to confine our initial experiment to men leaving the women and children to be cared for in the day skin clinic as had been the custom.

At the time the clinic was opened a poster was drawn up stating in short, pointed sentences the purpose of the clinic, the place where held, the clinic hours, and warning against advertising quacks of all kinds. These were printed in red in order to attract attention and tacked up in all the men's public toilet rooms in the city. A circular letter was likewise sent out to all the physicians in the Oranges, telling them of the clinic and asking them to refer any cases which they did not care to treat, for any reason, to the clinic in order that the might be advised and treated by competent attendants. As our purpose was primarily to provide a clinic where men infected with these diseases might secure friendly and honest advice and treatment, we did not make these diseases reportable fearing that some might be prevented from coming if this were done. We did, however, draw up a case card for use by the clinic physicians and for our own office records. A pamphlet was also printed for distribution to patients, setting forth the necessary precautions to be followed by those infected with these diseases in order to prevent its spread to others and to effect a permanent cure for themselves.

As soon as it was made known that such a clinic had been established patients began to come from all the Oranges so that at the close of 1914—end of six months' trial—it was found that fifteen of the thirty-six cases treated were non-residents. This fact was made known to the health departments of East Orange, West Orange, South Orange Village and South Orange Township with the request that they appropriate their pro rata share of the money necessary to run this clinic. They all came in most willingly and since January 1, 1915, it has been run under a system of joint control by a Committee made up of representatives of the five Oranges similar to that for control of the milk supply.

There are two practices in force at this clinic which we have found most successful and essential in order to forestall the time-worn criticism of "pauperizing" our patients; and to conserve our funds. This applies primarily to syphilis since the treatment of gonorrhœa is comparatively inexpensive and nobody objects to the

nominal charge to cover the cost of these materials.

Whenever a patient suffering with syphilis applies for treatment he is asked to deposit enough money to cover the actual cost of the salvarsan necessary to be given in his case in the best judgment of the physician. If he claims he cannot pay anything, or only a part, his treatment is begun at once but the social visitor of the hospital is sent out before the time for his second injection to investigate as to his financial status and previous history. If it is found that he is able to pay the whole or part we insist upon it before further treatment; if not, it is charged against the Committee's account. This we feel is just, both to the physicians practising in the Oranges and to ourselves, for it is not our purpose to supply indiscriminate free treatment or to take patients already under the care of a private physician but rather to reach those who either would not or could not engage a reputable physician and who might, therefore, neglect treatment entirely or fall prey to an unscrupulous quack.

The other practice appears to us fully as important and makes it impossible to confuse our clinic with anything other than a public health institution. The question arose as to where the Committee should stop in the salvarsan treatment of individual cases for which it was responsible. One indigent case of tertiary syphilis appeared and soon had consumed over $50 worth of salvarsan and it was pointed out that at that rate our appropriation of $250 would be very soon exhausted and that while it might be ideally desirable to carry on this kind of thorough treatment it was, however, impossible for health departments to take this attitude since their province was one of public rather than individual health and preventive rather than curative endeavor. After consultation with the clinic physicians it was, therefore, decided to clear up the acutely infectious cases with two or three injections of salvarsan and then continue treatment by the less expensive method of mercury and potassium iodide. This has been followed out ever since with most satisfactory results.

The G.-U. Clinic is looked upon by those interested as one of the most effective public health institutions in our midst and when one realizes that during the eighteen months, from July 1, 1914, to December 31, 1915, sixty-six cases of venereal disease have been treated, besides equipping the clinic, at a total cost of $222.90, it will be seen that the expense of this work is insignificant when compared with the immense good accomplished. Twelve more cases have been under treatment during the first three months of 1916 which shows that the work of such a clinic is never finished, that new cases are constantly appearing which require attention, and that it is both the moral and health duty of every community to provide some means of dispensing advice and treatment to this class of patients who might otherwise be left to chance treatment or none at all, imperiling the other members of their own families as well as others in the community.

MORE TROUBLE FOR THE HOUSE-FLY.

As if the present indictments against the house-fly were not sufficient to warrant and demand his extinction, another sanitary crime has been laid at his door. T. O. Shircore, in Mombasa, British East Africa, has found that the fly is a carrier of the eggs of various intestinal parasites and that the danger from this source of infection is seriously to be reckoned with.

Examination of 100 house-flies from a native ward showed that ten carried in the intestinal tract the eggs of Trichocephalus dispar, Tænia saginata, or of Ancylostomum. One hundred flies taken from the police latrines showed eleven ova carriers, in this case the three already mentioned and Schistosomum mansonii as well. Fifty flies from the native hospital showed six infected with ova of Trichocephalus dispar, Ancylostomum, and Ascaris lumbricoides. Twenty-five flies from the local meat market showed two infected with Trichocephalus dispar and Ancylostomum.

The most frequent ova were the last two. That ascaris infection was not more frequent was laid to the large size of the eggs, which are not so readily swallowed by the fly. It was found that the trichocephalus ova in flies withstood putrefactive changes for two months. Shircore very logically suggests the examination of the intestinal tracts of house-flies as a practical method of determining the ratio of helminth infection in a district where direct examination of the feces is not possible.—*New York Medical Journal*, May 13.

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THE LAG OF HEALTH LAWS BEHIND SCIENCE.

Education is taking the place of threat and prosecution in the prevention and control of disease but laws will be needed until the millennium comes. Efficient protection of the public health will always depend to a large extent on the summary exercise of the "police power" by local and state health officers or on the moral effect of the knowledge that this power can be used.

The statutes enacted by the state legislatures form the foundation on which this authority over persons and property must stand. The superstructure of detail governing the health officers in particular cases may also be supplied directly by the legislature or may be supplied by regulations of the state or municipal boards of health adopted under authority granted by the statutes.

In examining the health laws of various states, one is struck, first, with the archaic phraseology and the absurd emphasis on matters only remotely related to health. These relics of a prescientific age indicate that superstitions regarding the sources of disease die slowly. For example, the progressive state of Minnesota, so recently as 1913 enacted that "every building in which labor is employed shall be kept clean and free from *effluvia* arising from any sewer drain or privy." The popular belief that disease germs live a long time outside of the human body and that infection by fomites is of great importance is illustrated by "Mattress Acts" in almost every state from Massachusetts to California regulating the use of second-hand material in pillows and mattresses.

An equal fear of dead bodies and cemeteries as sources of communicable diseases is shown by statutes common to many states requiring the sanction of the state or local health department before a cemetery may be located or enlarged.

Of far more importance than instances of unnecessary legislation are the weakness or utter lack of statute foundation for regulations or procedures of prime importance. Great power is everywhere granted over "articles capable of creating sickness" but little is said of persons as sources of infection unless they are actually sick or are domiciled with those who are sick. Boards of health are largely helpless in dealing with incorrigible consumptives, typhoid carriers and persons exposed to infection. A hotel keeper in Massachusetts was upheld by the courts in refusing to show the hotel register to representatives of the State Board of Health at the time of an outbreak of typhoid fever among his guests.

The great importance of securing a medical examination of all persons engaged in the handling of food is just beginning to receive proper recognition. The return of "Typhoid Mary" to the occupation of a cook in a New York hospital with a resulting outbreak of typhoid fever is a recent illustration of this danger from typhoid fever. Dr. Cleaveland Floyd of the Boston Consumptives Hospital Out-Patient Clinic states that over 2 per cent. of the six thousand cases examined in the last seven years were cooks, waiters, bakers and others engaged in the handling of food and that one third of this number were proved to be throwing off tubercle bacilli in their sputum when they first came to the clinic. Like tuberculosis, syphilis may be spread by food handlers without our suspecting the source.

New York City has undertaken the medical examination of her ninety thousand cooks and waiters and has already obtained results which show this enormous task to be worth while. But few states have granted the broad police powers which have been conferred on the Department of Health of New York City. In Massachusetts, city and town boards of health are specifically empowered to require double impermeable floors for bakeries but the examination of food handlers is not mentioned and would probably require further legislation. This is also true in other states.

Assistant Surgeon-General J. W. Kerr has well said: "There is no use denying that many of the state health laws yet in force have to be stretched to the breaking point to cover actual conditions." The protection of our food supplies from infection and the efficient control of the acute infectious diseases as well as tuberculosis and the venereal diseases call for further legislation which shall restrict personal liberty. That such laws may be expected was indicated recently by the Court of Appeals of the District of Columbia which declared that "Measures looking to the public welfare are no longer tested by the strict letter of the Constitution. But public opinion, keeping pace with advancing civilization, is the progressive factor which calls for an enlarged invasion of private rights for the public good and which prompts courts to give greater elasticity to constitutional limitations."

THE PRESENT STATUS OF THE SCORE CARD OF MILK QUALITY.

PROFESSOR H. A. HARDING
University of Illinois, Urbana, Ill.

Read before the Laboratory Section of the American Public Health Association, Rochester, N. Y., September 10, 1915.

TWO years ago at the Colorado Springs meeting there was presented the plan of a Committee of the Official Dairy Instructors Association for the preparation of a score card of milk quality which should furnish us an acceptable basis for grading city milk supplies.

The Official Dairy Instructors Association is perhaps best known to you as the author of the dairy score card printed by the Federal Bureau of Animal Industry and used by the state of New York and many municipalities.

The limitations of this dairy score card as a measure of the quality of a city milk supply have long been recognized and have recently been pointed out in detail by Mr. Brew in Bulletin 398 of the New York Agricultural Experiment Station.

Recognizing that the present dairy score card did not offer a satisfactory basis for grading the products of a dairy, three years ago, the Instructors Association directed its committee to prepare a new score card for that purpose.

In sharp contrast with preceding efforts this committee decided to base its conclusions upon careful measurements of the factors involved. The magnitude and difficulty of this undertaking may perhaps be appreciated from the fact that approximately $50,000 has already been expended upon these researches, and the undertaking is not yet completed.

Naturally such studies concern themselves with the sources of bacterial contamination and with the factors controlling the growth of the bacteria in the milk.

The contaminating influences of the barn have now been fairly surveyed. The results are given mainly in the publications of the New York Agricultural Experiment Station. They may be summarized by stating that while the cow is important, the condition of the barn and its surroundings exert practically no influence.

The great influence of the germ life in the utensils in contaminating the milk was presented yesterday by Doctor Prucha, and the data will appear later in the publications from the Agricultural Experiment Station of Illinois.

The contamination of the milk up to the time it reaches the city is mainly due to the cow and to the utensils.

In practically all cases where more than twelve hours elapse between milking and sampling growth accounts for the larger part of the germs found. Accordingly, temperature control is the largest factor in controlling the germ life in city milk.

Extensive studies are now under way to determine the age and temperature conditions of the milk supplies of the cities of the United States.

After three years of committee work which were preceded by some years of individual work there is naturally some pressure for tangible results in the form of a score card.

During the present summer a tentative card for scoring the milk as it leaves the barn has been formulated and is now being tried in field studies. It is still too early to venture an estimate as to the date at which the finished score card will be in condition for general use.

This statement of the present status of the work would be incomplete if it did not include reference to the coöperative assistance of the International Milk Dealers Association, the Dairy Inspectors Association and the officials of a number of cities.

SOME OBSERVATIONS ON CAUSES OF HIGH BACTERIAL COUNTS IN MARKET MILK.

H. D. Pease, M. D.,
New York, N. Y.

Read before a General Session of the American Public Health Association, Rochester, N. Y., September 7, 1915.

THE causes of high bacterial counts in milk are obviously the result of the operation of two factors—the advent of bacteria to the milk, and the growth of bacteria after they have gained entrance to it.

Bacteria have access to milk first, from the cow; second, from the barn surroundings; and third, from the utensils.

It will not be the scope of this paper to consider directly the part which the cow itself plays in the development of high bacterial counts.

A host of investigators have shown that the milk as drawn from the udder, even under the best of aseptic conditions, varies from a few to substantial numbers and kinds of bacteria. The term, "the high count cow," is well known to dairy bacteriologists and is usually applied to an animal in apparent perfect health with outwardly a normal udder, but in whose milk, freshly drawn, are found considerable numbers of bacteria.

From the exterior of the cow, variable amounts of the elements from the skin and its appendages and of the dirt and manure associated with the same, may carry into the product varying numbers and kinds of bacteria. The latter may very properly be denoted as the dirt bacterial flora in milk. It is doubtful if any commercially produced milk is ever entirely free from them and the advent of moderate large numbers from such sources is doubtless possible.

Harding, Breed and others, conducting careful investigations under conditions where individual factors were alone subject to variation, have shown that such environmental barn conditions as the state of the air in the barn, the condition of the floor and the ceiling, are comparatively unimportant in influencing quantitatively the bacterial count in the milk. The Commission on Milk Standards of the New York Milk Committee have for some time emphasized the lesser importance of the "equipment" of the farm as compared with "methods" in affecting the size of the bacterial count, and methods, of necessity, relate to the conditions of the apparatus actually brought into contact with the milk.

From the work of Harding, Breed, Brew and others, we have become impressed with the great relative importance of the condition of the milk pails and other utensils, which come in actual contact with the milk, as factors in the development of high bacterial counts in milk. Here the chief and important point relates to the actual bacterial cleanliness of the utensil. During the last five years, the writer has had the fact impressed

upon him on numerous occasions, that the truly important, causative factor in the development of high bacteria counts in connection with industrial food operation can be traced to either improperly cleaned utensils with usually a subsequent growth of bacteria on their surfaces, or bacterial incubation in the food product through inefficient refrigeration or failures in other preserving processes.

In the summer of 1914, some of the product entering a milk plant in the City of New York, coming from certain creameries in the country, contained much larger numbers of bacteria than the standard of the Health Department of the City of New York permits in Grade B milk before pasteurization that is, above 1,500,000 per cc. Samples testing in the tens of millions of bacteria were common. It was deemed advisable to make investigations at the creameries to determine the causative factors for these high counts.

Prior investigations had shown that the bacterial condition of the milk cans returned from the creamery to the farmer represented an extremely important factor in this connection. In previous times each farmer was responsible for the cleaning of his own cans. The customary way of cleaning them is too well known to be described; it is sufficient to say that practically every intelligent farmer knows the necessity for having a reasonably clean, well-aired can. More recently, by reason of the efforts made with the hope of bettering milk supplies, attempts at central sterilization of cans have been more commonly employed. This, while thoroughly sound in principle, opened up new factors and led to new difficulties not previously experienced. The plan of central sterilization works satisfactorily, provided it is possible to efficiently wash and sterilize and dry a can during the time period which the farmer is willing to wait for the cans after he has emptied them.

It goes without saying that there are substantially no cans that have an entirely smooth interior. The more frequently the cans are subjected to sterilizing and refrigerating processes, the more likely are the soldered seams to open up macro and microscopically and furnish lodging places for the retention of milk throughout many periods of use. One who has not applied a soldering iron to an apparently clean seam, would be surprised at the character of the odor arising therefrom. Moreover, the amounts of metal in various parts of the milk can are not uniform. In attempts at effective sterilization by the use of heat, it is obvious that the parts of the can containing the most metal require the longer time period of action on account of the increased amounts of heat taken up by the larger quantities of metal. There can be no special rules laid down as to the amount of time necessary for the sterilization of a can by heat without consideration of a number of other factors. It is sufficient to say that under the average conditions as they occur in creameries, thorough sterilization of milk cans before returning them to farmers rarely takes place, although reasonably efficient, obvious and bac-

terial cleanliness is usually accomplished.

There remains one factor of very great importance to be considered in this connection: a can thus cleaned if allowed to go to the farmer in a moist condition with the cover remaining on it to prevent access of dust and bacteria from the air, will not remain in such a satisfactory condition if the temperature of the surrounding atmosphere is sufficiently high to produce incubation of the remaining microorganisms in the moisture on the interior surface of the can. This is a factor of no mean importance. We have found cans on farms that were to the naked eye clean and yet in the wash water we have obtained not infrequently bacterial counts in the hundreds of millions to billions, the high count being unquestionably the result of incubation of the bacteria which had been left behind after reasonably efficient, obvious and bacterial cleaning.

In last summer's investigation, already referred to, these results were amplified and a very considerable number of cans were found to show very high bacterial counts. Milk containing less than 50,000 per cc., when added to such a can, will show exceedingly substantial increases in numbers of microörganisms. It therefore is unquestionable that incubation, taking place in the warm season of the year in the moist interior surfaces of the cans, and other milk-handling apparatus which have apparently been satisfactorily cleaned, is a large factor in high bacterial counts. One only needs to consider the possibility of farmers holding cans for even several days without use and without cleaning before use during the summer season, to realize the opportunities for incubation offered by cans handled in such a manner. Moreover, such bacteria have passed through a preliminary cultivation in diluted milk and are prepared for a very rapid growth in the product.

We need not take into consideration here the fact that farmers frequently use cans for the holding of skim milk for the feeding of animals. When skim milk is returned from the creamery to the farmer, it may frequently happen that it is not all fed to pigs or otherwise used within a few hours and it is often the case that such cans will be inefficiently washed at the farm and subsequently used for the handling of fresh milk for the creamery.

The principles involved and the effects produced by incubation in milk cans are applicable wherever similar conditions of apparently satisfactory cleaning, with retention of moisture and opportunities for incubation, occur. High bacteria counts may be looked for in the product handled in such apparatus. This applies not only to the farmer's utensils, but also to the apparatus in creameries and in other establishments handling milk at average temperatures. Valves, milk pumps, corners of tanks, bearings of agitators are very likely locations for such incubation, and are common sources of high bacterial counts in pasteurized milk.

In the investigations of last summer, 767 samples were taken from indiscrim-

inately selected cans of milk brought by each farmer to nine creameries. Temperatures were taken of the contents of each can. The examinations of these samples showed the following results: 50 per cent. of the 767 samples of farmers' milk showed bacterial counts of 50,000 or less; approximately 80 per cent. of the samples showed bacterial counts of 200,000 or less; approximately 15 per cent. showed a bacterial count of from 200,000 to 1,500,000 and only about 5 per cent. contained counts over the standard for Grade B of 1,500,000. In the 5 per cent. showing over the million and a half it was rarely the case that the numbers were less than tens of millions.

Condition on Arrival in City.

The important conclusion undoubtedly warranted by these results is that while a very large proportion of farmers delivered milk of reasonably low bacterial counts, a very small proportion delivered milk of such excessively high counts as to increase substantially the general average bacterial count of the milk from each creamery; that is, the high average was in almost every instance due to the use of a small number of cans of milk from a small number of farmers, which milks contained tens of millions of bacteria.

As temperatures of the milk from each can had been taken it was interesting to determine the relation of high temperatures of milk on receipt at the creamery to the bacterial count obtained. While at times extremely high temperatures were associated with high bacterial counts, this was by no means true even on the average. Far more samples of milk of low counts were collected from cans of high temperature than high counts from similar cans. In other words, the temperature of the milk, as it is received at the creamery, is not by any means a safe index for the passage of judgment as to the probable bacterial count of the product contained therein.

It is easy to speculate as to the probable causes for these high bacterial counts, but time will not permit of their consideration. The important fact is that a very few farmers, and even a smaller number of cans of milk in the section of the country supplying milk to New York City, are responsible to the largest possible extent for the high bacterial counts which have occurred quite frequently during the summer season.

Tests were made of the milks after handling by the creameries and when in the cans ready for shipment to the city; likewise, tests were made after receipt in the city. Without attempting to go into details, it can be said that, with but one exception, the creamery conditions could not be held responsible for any high bacterial count observed in the milks ready for shipment to the city. Milks under observation in this investigation were shipped to the city under conditions of icing in transit of an average high standard and in all but one instance the average count of samples from the cans sampled in the city was somewhat higher than the average counts from the same cans before

starting on their journey. However, taking into consideration the variability associated with bacterial count on the same samples of milk, the discussion of which has already been conducted by Professor Conn, the difference between the average New York City counts and those on the products from the same cans in the creamery were not strongly significant of any substantial increase due to failure in icing during transportation.

Neither the individual nor the average scores of the farms from which the milk examined was derived are available, but the scores must have been well above the average of 68 for Grade B milk for the city of New York.

It is fortunate that there are available for consideration at this time the results of bacteriological investigations made during the present summer upon samples of milk coming to a city dairy plant, which is located in a section of the country where substantially no efforts for the betterment of the milk supply have been made in times past. The farmers supplying milk to this city plant are on the average of a low grade of intelligence and with very meagre or no ideas whatever of obvious, much less bacterial, cleanliness. The character of the milk coming to this plant is clearly indicated by the fact that during the months of May, June, July and August the average bacterial count on samples taken on 27 days of the raw milk as it was passing to the clarifier was 14,000,000, the lowest count being 2,600,000 and the highest 35,000,000. The average of several counts on samples taken during a period of 30 days showed the lowest to be 1,100,000 and the highest at 33,000,000. The average of the samples from all of a group of 47 farms was approximately 7,000,000; the average scores of these farms was 34, the highest being 60, the lowest 18 and but two of them over 50. We have in this case, therefore, milk coming from a large number of nearby farms of the lowest type from the sanitary standpoint.

Milk from these 47 farms is brought direct by the farmer to the city plant over an average distance of 8 miles. The milk is all cooled before transportation but to what extent is not definitely known. It is all delivered within 20 hours of milking and generally twice in the 24 hours. The competent bacteriologist in charge of this city milk plant expressed the opinion that incubation of the milk could hardly be a prominent factor in the causation of the high bacterial counts.

We have available for comparison with the counts already given for farmers in the state of New York, the results of examinations of samples from 50 cans taken at random from the product of 15 farmers, as it was being delivered to the city plant. From these cans there were no samples showing less than 100,000 bacteria per cc., as compared with 50 per cent. of samples in the New York State investigations showing less than one half that number.

Ten per cent. of the samples contained 200,000 bacteria per cc., or under as compared with 80 per cent.

in the state of New York investigation. Fifty-four per cent. showed counts of 200,000 to 1,500,000 as compared with 15 per cent. in the New York State investigation.

Thirty per cent. gave counts of over 1,500,000 as compared with 5 per cent. for the New York State results, and of this 35 per cent., 19 per cent. was in the tens of millions class.

The results that have just been reported are probably fairly representative of the bacterial character of the milk supplies of the majority of communities before the days of efficient official or private supervision.

In the opinion of the bacteriologist who was kind enough to furnish me with the evidence here given, the high bacterial counts in the milks coming from these farmers are due on the average to lack of cleanliness on the farm. A study of the results of the samples from individual cans from the 15 dairies goes to show that all of the 10 per cent. of low counts came from two farms, one of which, while very poorly equipped, was under the direct operation of persons of very cleanly habits. In no case did any milk from this farm contain a million bacteria per cc. The average was well under 500,000. One might perhaps be warranted in classifying the farmers showing the high bacterial counts in the products under these circumstances as purveyors of dirty milk, whereas, in the opinion of the writer it is altogether inappropriate to classify the New York State farmers showing the high bacterial counts already described as purveyors of dirty milk for, in fact, the milk was not dirty *per se*. The high bacterial counts almost invariably were due to the growth of undoubtedly normal numbers of bacteria which had originally gained access to the milk.

Conclusions.

In parts of the country where adequate field and laboratory supervision of milk supplies have been in operation for a number of years, high bacterial counts are most generally caused through inefficiently cleaned apparatus, and by the incubation of bacteria taking place either on the moist surfaces of cans or other utensils, or that taking place in the product itself due to inefficient refrigeration.

In locations where no supervision has been in operation and where the producers are naturally more or less slovenly, the rather uniform, high bacterial counts found in milk from such farmers may be more or less appropriately attributed to definite dirty conditions. This would be especially true of the instances where the milk can be shown to have been delivered promptly and with the application of a reasonable degree of refrigeration.

The result of the comparisons made between these two groups may be taken as a fair index of the excellent results that have been brought about through the persistent, intelligent application of the methods of official and private milk supervision which have been in operation in most of the large centers of population during the past decade.

BACTERIAL TESTING VERSUS DAIRY INSPECTION.

CHARLES E. NORTH, M. D.,
Director, the North Public Health Bureau, New York City.

This paper has especial interest for the laboratician and dairy inspector, and general interest to everyone. Mr. Laboratician, do you test for "number" or "kind?" Mr. Inspector, do you work in coöperation or in opposition to the laboratory? Doctor North is well suited to write on the milk question, and he discusses in a clear and convincing manner the many problems essential to the maintenance of the health standard of this industry.

WHAT do large numbers of bacteria in milk signify? Here is a question that has staggered the intellect of the majority of milk bacteriologists and milk inspectors. A convention on milk rarely passes its first session without some Solon arising to remark that "it is not the number but the kind of bacteria" which is significant in milk. This comment is a classical and traditional objection raised regularly against the advocates of the use of "the bacterial count." And yet in the face of the admission that tests for "number" do not determine the "kind" the tests for number have grown in popularity.

Numbers of bacteria in milk if excessive may signify: (1) initial contamination in the dairy from the cows, or from the milkers, or from the barns, or from unclean utensils; (2) secondary contamination during milk handling and transportation, by exposure to accidental pollution, or to unclean milk apparatus or containers; (3) to the growth and multiplication of bacteria as a result of inefficient cooling and refrigeration, or an excessive length of time between production and consumption—often called the "age" of milk. These things may be summarized by saying that large numbers of bacteria in milk indicate that it is "dirty" or "stale" or both "dirty and stale." This conclusion is based upon the abundant experimental evidence that where milk is clean and fresh it always without exception gives a bacterial count of small numbers. The public has a right to demand that milk should be clean and fresh and not dirty or stale. Health officers are justified in demanding that milk dealers deliver a product clean and fresh, and in using the bacterial test as an index of cleanliness and freshness, and in establishing bacterial standards as a basis for excellence with respect to cleanliness and freshness. The primary purpose of the bacterial testing of milk by the use of the bacterial count is to determine its sanitary character.

Dairy inspection has as its primary object the maintaining of sanitary equipment and methods of milk production and milk handling. The fundamental purpose of the inspection is to prevent the contamination of the milk and to see that it is properly cooled and refrigerated. Such contamina-

tion always means dirt and dust from cows, barns, employees, utensils, containers, etc. Such contaminations are so commonly associated with bacteria that their entrance into milk means the inoculation of milk with bacteria, as shown by an increase in total numbers corresponding with the degree of contamination with dirt. In the face of this well known fact it is amazing to hear some of the most prominent bacteriologists and sanitarians assert that "the numbers of bacteria are only one factor in milk sanitation, for we must also take into account the sanitary conditions of the dairy and the methods of milk handling." Certainly the only considerations worthy of the attention of the health officer and sanitarian are those that affect the milk itself, and there is no way in which the dairy or milk handling can affect or contaminate milk without such contamination being reflected in that most delicate of tests we call "the bacterial count." Experience in dairy inspection has clearly shown that where the bacterial count is consistently low, milk contaminations are regularly prevented and efficient refrigeration is practised; and, on the other hand, where bacterial counts are high, sanitary methods of prevention are neglected, contaminations take place, and efficient refrigeration is not carried out. The dairy inspector has behind and underneath all of his work the purpose of preventing the contaminations of milk with dirt and with bacteria which commonly accompany the dirt. To assert that dairy "equipment" and "methods" deserve special consideration on any other grounds or for their own sakes is a strange philosophy, and loses sight of the intimate connection between them and the product itself. It is like the dog chasing his own tail. The inspector after all must go to the bacteriologist to learn his "results," and the bacteriologist must look to the inspector for his "causes."

Both the inspector and the bacteriologist must surrender when asked regarding the "kind" of bacteria. Their work in dairy sanitation must use the "number" as the indicator of results. The question of "kind," because of the physical obstacles in the way of any regular routine laboratory tests for pathogenic species of bacteria, must remain unanswered. The degree of risk from the bacteria of disease can be greatly diminished by sanitation. Milk with very small numbers of bacteria has received very slight contamination with dirt and a diminished risk from material infected by men or animals. Veterinary inspection of dairy cattle may reduce the risk of infection with the bacteria of cattle diseases. Medical inspection of dairy employees may reduce the risk of infection with the bacteria of human diseases. But neither the sanitary inspector, nor the veterinary inspector, nor the medical inspector, nor the bacteriologist is able to furnish the milk consumer with any definite answer to the question of the "kind" of bacteria in milk. In the face of the best work of these four classes of experts no test has been devised competent to determine in routine practice the "kind" of bacteria in market milk, or to protect

even the highest grades against occasional infection with the bacteria of disease from dairy cows or from dairy employees. There is one, and only one, method of positively settling the question of the kind of bacteria in milk, and that consists in the process of pasteurization, which, properly performed, can be depended upon to destroy all species of infectious bacteria transmissible by milk.

In spite of the opposition of the milk industry to its advent, both on the part of individuals and organizations, and in spite of the open opposition of some sanitarians, the laboratory for bacterial testing of milk by the bacterial count has increased in popularity, and seems to be with us to stay. Federal, state, and municipal laboratories are established for this purpose, and the only question remaining seems to be just what limitations should be placed on the functions of such laboratories, and on the conclusions drawn from their work.

The growth of the bacterial testing of milk has taken place in open competition with the well established system of dairy inspection. Previous to any widespread practice of bacterial testing it was well recognized that dairy sanitation should be controlled by a system of dairy inspection. It seemed on the face of it a simple proposition for municipalities to control the sanitary character of their milk supplies by suppressing and preventing contaminations through the activities of a force composed of one or more milk inspectors. Through the visits, regular or irregular, of the milk and dairy inspector supervision could be exercised over dairy barns and the processes of milk handling, from the producer to the consumer, and it was believed that the conditions observed and maintained by the producer and dealer would be reflected in the character of the product as delivered to the consumer. As a consequence dairy inspection had become well established in the early history of the campaign for milk reform, and the inspector of milk sheds was looked on by municipalities as a public official secondary in importance only to the inspector of watersheds.

The laboratory for making bacterial tests of milk entered the field at first somewhat as an interloper, and, in most instances, under auspices which were independent of the milk inspection service. It is not more than fifteen years ago that the bacterial testing of milk by municipal laboratories developed to a point where it became a factor of any importance. Its growth was characterized at first by uncertainty as to its methods, numerous variations in method being noticeable as a result of local option on the part of the directors of laboratories in various cities. Variations in methods naturally led to inconsistencies in results, so that comparisons between tests in different cities and even tests of laboratories in the same city were incongruous. In addition to the uncertainty of method has been the uncertainty of the relationship which the bacterial results bore to the sanitary character of milk, and the uncertainty of the relationship which the bacterial laboratory bears to dairy inspection as a whole.

Dairy inspection itself, however, was in an uncertain position, and although established as a practice for many years, and at present firmly established, its exact relationship to the sanitary character of milk is still indefinable. While this uncertainty has been referred to by numerous authors, one of the clearest expositions appears in a Bulletin of the Virginia Polytechnic Institute published in September, 1911, entitled: "A Study of the Bacterial Count and Dairy Score Card in City Milk Inspection," by Brainerd and Mallory, in which the authors tabulate a series of tests on milk and a series of dairy inspections which show that there is no definite relationship between the character of the milk and the character of the dairy where the milk is produced. Among their conclusions they state: "The score card is defective when used as a measure of the sanitary properties of milk. . . . These experiments clearly show that it is possible to produce good milk under conditions which would give a score below any effective standard which might be established. . . . The chief difficulty of the score card is that as a measure of the sanitary properties of milk none of the points scored have a permanent value under all conditions, and it is questionable whether they have a definite value under any given set of conditions."

Numerous investigators have from time to time shown the possibility of producing sanitary milk in dairies where external conditions are extremely unsanitary. As a consequence, it is necessary to acknowledge at the outset that the conditions which can be observed by the dairy inspector bear no definite relation to the sanitary character of the milk itself. The production of "Grade A Milk" for the New York City market in several thousand barns of the ordinary type by the rank and file of dairy farmers, such milk in most cases conforming with standards for bacteria of 25,000, and even 10,000, is a demonstration of this fact on a gigantic scale.

On the other hand, the testing of milk for bacteria by the laboratory has gradually developed methods which have become so well standardized that the inconsistent results at first complained of have been greatly reduced. The standard methods recommended by the Laboratory Section of the American Public Health Association can be depended upon to produce in duplicate samples, bacterial counts which will vary on the average not more than 25 per cent. In some good laboratories such results may not vary more than 10 per cent. Even a 25 per cent. variation is a degree of accuracy which is sufficient for practical purposes in testing between milks of different grades. For example, in the case of certified milk having a standard of 10,000 bacteria per cc., a 25 per cent. variation would mean the difference between 10,000 and 12,500 bacteria per cc., so that it would be easy for a laboratory making tests within such limits to distinguish milks varying in excellence within such limits as 10,000, 50,000, 100,000, 500,000 and 1,000,000 bacteria per cc.

One of the commonest faults alleged

against the testing laboratory for bacteria has been its inefficiency and inability to test the entire municipal milk supply without prohibitive expense. It is true that the principles which have been heretofore practised in research medical laboratories, in which expensive and refined equipment, and abundance of time for deliberation and study, and high salaried workers prevailed, have engendered the belief that bacterial testing could not be widely extended by health authorities or by the milk industry. The type of laboratory required, if it is to properly fulfill its function as an instrument in the hands of the health officer or dealer, must embody a large capacity for work at high speed and low cost both for equipment and operation. A comparison of the equipment, efficiency, and expense of municipal laboratories now in operation shows plainly not only remarkable variations in efficiency and economy but the need for standardization, not only of methods, but of the conduct of laboratory work as a whole.

Simplicity is the first element in efficiency. There are certain essentials of laboratory equipment and methods which may be separated from nonessentials. Without going into too much detail, it may be pointed out that culture media may be produced by the use of simple cooking utensils, and in large quantities, with the same expenditure of time that in some laboratories small quantities are produced with elaborate apparatus. The culture medium may be kept in flasks of 300 to 500 cc. capacity, rather than in test tubes, thus reducing greatly the number of mouths to be cleaned and filled and plugged. Dilution bottles may be marked at the point required for 99 cc. or 9 cc. capacity, thus greatly saving the time required in measuring and filling. Pipettes of plain glass with only one mark at the 1 cc. point are all that are required for making milk dilutions. Petri dishes of the deep kind, rather than the shallow kind, facilitate speedy work. Incubators such as are used for the incubation of hens' eggs are cheap and very much more efficient in many instances than the elaborate and expensive incubators sold by laboratory supply houses. It is possible to write the specifications for the complete equipment of a milk testing laboratory capable of testing from 100 to 200 samples of milk daily at a cost of not more than $500.00, and as little as $200.00.

In the laboratory itself efficiency methods should begin with sample taking, using sample cases capable of carrying from fifty to one hundred tubes, and a sheaf of fifty to one hundred pipettes, suitably constructed to hold cracked ice sufficient to keep milk samples cool.

In the laboratory, plating tables should be high so that work can be done standing up, and tables should be long so that a large number of samples can be lined up for plating at one operation. Simple carpenter's horses with long boards will answer the purpose as well as expensive tables with stone or marble tops. Bottles and plates can be arranged in long rows systematically, and marked in series, and the work done consecutively by

two or more workers coöperating and following each other down the line making dilutions and pouring agar. Rapid counting of colonies can be facilitated by counting in groups of 5, 10, 15, 20, etc. By efficiency methods a first class worker, under pressure, can plate milk samples without any neglect of sanitary precautions at the rate of fifty samples per hour. One hundred samples per day is not too much to ask of one worker for both plating and counting, provided glassware and culture media are furnished by assistants.

The above statement is certain to be questioned, especially by many of the directors of municipal milk laboratories. In my personal inspection of the majority of milk laboratories in large American cities, the maximum number of samples tested by the individual worker in any laboratory was thirty samples per day, while the minimum was five samples per day. These numbers are in remarkable contrast with the number of samples handled in large commercial laboratories, and in laboratories established by the milk industry, where at least 50 samples constitute a day's work.

Regarding the type of laboratory worker required, the plating of milk itself is a mechanical process, requiring no special preliminary training. The making of dilutions, pouring of agar, and the counting of the plates are operations easily mastered by any bright boy or girl with a high school education after a training of about six weeks. Such young persons can be employed at salaries ranging from $12 to $25 per week, and many of them are now so employed and working daily in many of the large milk testing laboratories in this country. Such workers, of course, cannot qualify as bacteriologists or as expert witnesses. But for the simple "plating" of milk samples for bacteria their work is reliable.

No one can make a study of the volume of work which is being handled in the efficient type of milk testing laboratory referred to, or of its cost, without being satisfied that at the present time the testing of milk for bacteria in such laboratories has been perfected to a degree which places the application of this method of control easily within the reach, not only of every state and municipality, but also within the reach of country villages. Such a laboratory is rapidly becoming an essential part of every well organized milk business.

It is only by a survey of the results of many thousands of tests in laboratories doing a large volume of work that the real significance of the bacterial testing of milk becomes apparent. A single test, or a small series of tests, fails to show the real strength of this method of milk control. When one contemplates series of tests carried through weeks, months, and years, drawn from the same sources, it becomes obvious even to the casual observer that the numbers of bacteria as shown by the bacterial count bear a very close relation to the care exercised by the milk producer and the milk dealer. At the shipping stations where so-called "Grade A Milk" is being produced for New York City and other markets the statistics which

have been compiled show plainly that whereas formerly the milk produced by large groups of farmers contained hundreds of thousands, and frequently millions of bacteria per cc., it now contains only a few thousand—often less than 10,000 bacteria per cc. The reduction in the bacteria corresponds closely with the change in the methods of sanitary care exercised by the producer.

In the same manner, it can be shown by a study of the statistics in the books of large milk laboratories that the refrigeration of milk regularly prevents the growth of bacteria, and that large numbers always result from lack of refrigeration.

Finally, the efficiency of the large machines used for pasteurizing milk can be quickly ascertained by testing milk before and after treatment for the numbers of bacteria which it may contain. Good pasteurizing machinery should destroy at least 99 per cent. of the bacteria commonly found in milk. In connection with such machinery the bacterial test is particularly useful, performing the function somewhat similar to the bacterial test as applied to plants for the filtration of water. Groups of samples, taken in series, of raw milk before treatment, of milk after heating, after holding, in a heated condition, after cooling, and after bottle filling, show clearly whether the operation of a pasteurizing machine is efficient, and if not at just what step in the process the operation is a failure.

Up to the present time the tendency has been to consider the milk testing laboratory as a law unto itself, and a department by itself, and to consider dairy inspection, as conducted by the force of milk inspectors, as a law unto themselves, and a department by itself. The uncertainties of laboratory testing above referred to may have in the past justified separate organizations of this kind for the reason that any possibility of coöperation might well be postponed until the usefulness of each of these factors in milk control had been independently demonstrated.

I believe, however, that now we have arrived at a point in our knowledge of the utility of each of these factors of milk control which justifies the establishment of a more definite relationship between the two and a readjustment of their functions, not only in the interests of economy, but in the interests of efficiency.

The dairy inspector to whom a certain territory is assigned, which he must periodically cover without any knowledge on his part excepting the geographical location of the dairies which he is to visit, is like a man who goes about his work blindfolded. He does not know the character of the milk produced in the dairies he is to visit, and neither does he know until he arrives on the premises whether the dairy is sanitary or unsanitary. If he should devote one day to visiting ten dairy farms it is easily possible that eight of these may be in a good sanitary condition and only two in an unsanitary condition, and by night time it is perfectly obvious that much of the inspector's time has been wasted in visiting the eight sanitary dairies, and that only a portion of his time has been expended efficiently because

of the two unsanitary dairies which he visited. So I assert that a large portion of the time of milk and dairy inspectors is wasted in visiting premises which they discover to be in a good sanitary condition. On the other hand, the unsanitary dairies which require their inspection, and for the inspection of which their office is created, are not visited as often as they should be nor do they receive the benefits of dairy inspection which is intended for them because of the intervention of sanitary dairies, and of the waste of time on the part of the inspector in visiting dairies which need no inspection.

In addition to this, it is a fact that some dairies which appear to be in good sanitary condition are actually producing very foul and contaminated milk, but may be given a clean bill of health by the dairy inspector because of external appearances. Also, it is true that milk of the highest sanitary character is frequently being shipped from dairy barns which, perchance, the dairy farmer is renting from the owner, and which for this reason he cannot afford to renovate, but in which by practising the more important sanitary methods the farmer is regularly producing a most sanitary article. These premises the inspector condemns because of their unfavorable external appearances. As a result, an inspection service so conducted may be called a blindfold service, and an aimless service full of inconsistencies and full of inefficiency.

The work of the inspector can be made intelligent and efficient only by the bacterial testing laboratory. The foundation of any inspection system should be the laboratory service. The testing of the milk should precede the inspection of the dairy. The testing of milk samples for bacteria at once divides the product into two classes, sanitary and unsanitary. The source of supply being known, the inspector's attention can at once be directed to the places from which unsanitary milk is being shipped. Through the intelligent tabulation of laboratory tests the dairy inspector can ascertain, not only the occasional irregularities and variations in individual milk supplies, but the general character of all milk supplies.

This work should begin on the city end of the line. Samples of milk taken from bottles and cans as sold on the market should be tested for numbers of bacteria. When such numbers are high in the case of pasteurized milk the inspection service should send an inspector to examine the operation of the pasteurizing plant. In such cases common defects are the use of too low temperature for pasteurization, or imperfect cleaning of the pasteurizing or bottling machine, or dirty bottles. In the case of high counts in raw milk, the inspector must be directed to examine into conditions of the raw material as it is received from the country.

Next to the examination of the final packages for sale on the market, the main point of attack should be the "receiving tank" or "dump tank" in the bottling and pasteurizing station in the city. This is the strategic point, not only for detecting the general character of the mixed milk of

an individual dealer, but also the point at which samples can be taken from the cans received from all of the various dairy districts from which this supply is secured. Bacterial tests taken at this point will indicate by the high counts which of the several sources of supply are shipping unsanitary milk, and which, therefore, require the attention of the inspection service.

In like manner, the laboratory service should invade the country, and take samples of milk in the country shipping stations from the cans of individual producers, and by the laboratory reports direct the inspection service to the location of dairies producing unsanitary milk.

In short, the laboratory test should precede the dairy inspection along the line from city to country. In this way the laboratory can locate unsanitary milk, and direct the inspection service into the channels where such service is needed most. This would mean not only a great saving in the time of the dairy inspector, now largely wasted in inspecting sources of sanitary milk, but a great increase in efficiency because the inspection is concentrated on the sources of unsanitary milk.

In place of a territorial distribution of inspectors, such as is often provided by large municipalities, and a periodic inspection of dairies irrespective of the character of the milk produced, the consolidation of the laboratory service with the inspection service transforms the inspection force into a flying squadron, quickly concentrated if need be upon such portions of the municipal supply as the laboratory discovers is most unsanitary. Through such laboratory coöperation the inspection force can carry out "raids" on the entire business of the individual dealer, covering both the city and country end of the business, for the quick location of unsanitary milk. From such raids the honest dealer would have nothing to fear, but they would constitute a most potent influence in controlling dealers who are careless or unscrupulous.

Such a scheme of coöperation between the bacterial laboratory service and the inspection service means a change in form of organization, which would centralize the authority of both services in one office with a single head. Both the laboratory work and the inspection work should be directed by this single head. From such a head a comprehensive plan of campaign can be formed, both for the laboratory tests, and the dairy inspections, for the control of the entire municipal milk supply with the greatest economy and efficiency.

Up to date there has been an undercurrent of competition, amounting almost to an antagonism, between dairy inspection and bacterial testing. This "irrepressible conflict" will be terminated by the form of coöperation above suggested. The laboratory function is to examine results, and to locate unsanitary milk. The inspector's function is to ascertain the causes, and to apply remedies. Each has a distinct and a most useful function to perform, which can be increased in value more than 100 per cent. through intelligent coöperation.

Widespread bacterial testing of milk

through the establishment of efficient milk testing laboratories will constantly furnish milk inspectors with information as to the sanitary or unsanitary condition of their entire municipal milk supply. Such a birds-eye view of the supply can only be obtained by a large volume of bacterial testing, made possible by efficient laboratory methods. Equipped with such information, dairy inspection acquires a new significance and an added importance. The concentration of the inspection service on the sources of unsanitary milk brings speedy and remarkable results, as shown by the reduction of the bacterial counts, and the improved sanitary character of the milk.

In forming plans for the expenditure of the annual appropriation for milk control the milk dealer as well as the health officer should bear in mind that one laboratory worker can test the milk of fifty dairy farms for bacteria while one dairy inspector is inspecting five dairy farms, and that therefore one dollar spent in laboratory testing covers as much territory as ten dollars spent in dairy inspection. The laboratory test should come first and make the diagnosis; the dairy inspector should come second and apply the remedy. These principles result in the greatest economy and efficiency, whether control is being exercised by the milk dealer or by the health officer.

A HEALTH HANDICAP.

A board of health that does not control the registration of vital statistics within its jurisdiction is seriously handicapped in its efforts to render the best health service. The importance of having births, marriages and deaths reported to the health authorities is now greater than ever before. The growth of work for the prevention of infant mortality makes the reporting of births to the health authorities having such work in charge imperative.

The legislature provided for the collection and tabulation of vital statistics before many boards of health were in existence. Later, when the State Board of Health was created, the registration of such statistics for the state was taken from the office of the Secretary of State and given to the State Board of Health. In many communities the local registration is still in the hands of officials other than health officials. There is need of legislation to clear up this situation and place the registration of vital statistics in the hands of boards of health in all communities.

With reference to the registration of births the present situation is anomalous inasmuch as the law requires local boards of health to enforce the birth registration law but does not provide the means whereby boards of health can know whether or not births are reported in districts where reports are made to some other authority. In view of the great interest now being manifested in baby welfare and the prevention of infant mortality, there should be no delay in adjusting the method of birth registration. Unless boards of health receive reports of births they cannot utilize their nurses in this work to the best advantage and therefore the best results cannot be secured.

The Bureau of the Census at Washington is establishing a registration area for births. In order to be admitted to this area a state must enforce its birth registration laws and actually secure the registration of at least 90 per cent. of the births. Under present conditions it is practically impossible for local boards of health in many communities to obey the mandates of the law in securing such registration because the births are not reported to the board of health.—*Public Health News*, New Jersey State Department of Health.

STUDIES ON THE CLASSIFICATION OF THE COLON-TYPHOID GROUP.

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SINCE the studies of Smith in 1905 in an attempt to differentiate the lactose-fermenting organisms by the use of saccharose and gelatin, there have been proposed many systems of classification based upon the ability of the organisms to cause the fermentation of other substances. With the use of an increasing number of glucosides, sugars, alcohols and aldehydes, in addition to the other tests commonly applied, there have been described a large number of types, while a still larger number seem possible.

In 1905 MacConkey suggested a further division of these two groups, established by the use of saccharose, according to their ability to ferment dulcite. Later he proposed a further subdivision based upon the use of additional sugars and other tests.

In 1911 Jackson, following the lead of MacConkey, separated this group into sixteen types.

In 1912 Howe, working with 540 strains of lactose-fermenting, non-liquefying organisms, concluded that motility, quantity of gas formed and fermentation of mannite, dulcite and starch show but little correlation with other properties. He confirmed the basic classification introduced by Smith, and claims that dextrose, lactose, saccharose and raffinose constitute a true "metabolic gradient."

Kligler, working with 80 organisms from the collection of the American Museum of Natural History, used dextrose, lactose, saccharose, salicin, glycerin and dulcite, with the aim of correlating the reactions obtained by these substances with gelatin, indol and the Voges and Proskauer reaction.

Rogers, Clark and Davis have made a thorough study of the amounts of carbon dioxide and hydrogen produced by the organisms of the colon group, eliminating the many sources of error which have heretofore so vitiated the accuracy of the determination of these gases.

During the past three years we have isolated about 5,000 gas-producing organisms from the water supply of Baltimore, and subjected them to examination in various media in an effort to discover if possible some combination of fermentation tests that would furnish a truer biological classification of the members of the colon-typhoid group.

In the beginning we followed the procedure of the Standard Methods of the American Public Health Association, using lactose, dulcite and saccharose, with gelatin incubated for two weeks at first and later for thirty days. The results are shown in Table I. Of those organisms classified according to the fermentation reactions alone as B. communior, 13 per cent. liquefied gelatin in 30 days; of those organisms classified as B.

TABLE 1.

	Gas in dextrose.							
	Gas in lactose.				No gas in lactose.			
	Gas in sucrose.		No gas in sucrose.		Gas in sucrose.		No gas in sucrose.	
	Gas in dulcite.	No gas in dulcite.	Gas in dulcite.	No gas in dulcite.	Gas in dulcite.	No gas in dulcite.	Gas in dulcite.	No gas in dulcite.
Gelatin not liquefied in two weeks	91	162	98	97	8	43	5	–
Gelatin liquefied in two weeks	5	7	5	0	3	7	0	–
Per cent. liquefied	5	4	5	0	30	14	0	–
Gelatin not liquefied in four weeks	367	333	236	323	0	16	3	69
Gelatin liquefied in four weeks	68	295	3	27	1	82	1	24
Per cent. liquefied	13	47	–	9	–	83	–	26

aërogenes, 47 per cent. liquefied gelatin; of those classified as B. communis, 1 per cent. liquefied gelatin; and of those classified as B. acidi-lactici, 9 per cent. liquefied this medium. When the gelatin cultures were incubated for two weeks there were only about one tenth as many liquefactions with organisms isolated from the same source.

Not being satisfied to consider all of the saccharose-positive dulcite-negative organisms which liquefied gelatin as a variety of B. aërogenes, we continued the use of lactose, saccharose and dulcite, with the addition of glycerin and raffinose, and made tests for motility, indol and Voges and Proskauer's reaction. All motility tests were made on 6 to 18 hours cultures in beef-infusion bouillon, and only definite motility was accepted as positive, all non-motile organisms being examined again after one or more rejuvenations. The gelatin cultures were incubated for six weeks, it having been noticed that a certain type of organism (a form of B. cloacæ) did not cause any liquefaction until the fifth or sixth week. The sugar media were made from meat-infusion broth, inoculated to remove inosite, and Merck's chemicals were used for the fermentative substances.

These results are shown in Table 2. None of the motile organisms which fermented lactose, saccharose and glycerin (B. communior) liquefied gelatin nor produced a positive V. P. reaction, but nearly all produced indol. On the other hand, 96 per cent. of the motile organisms which fermented lactose and saccharose but not glycerin (B. cloacæ) liquefied gelatin; 85 per cent. produced indol and 50 per cent. produced a positive V. P. reaction. Eighty-two per cent. of the glycerin-positive organisms (B. communior) and 26 per cent. of the glycerin-negative organisms (B. cloacæ) fermented dulcite. Twenty-five per cent. of the dulcite-positive and 68 per cent. of the dulcite-negative organisms liquefied gelatin. Practically none of the lac-

TABLE 2.

			Gas in lactose.															
			Gas in sucrose.								No gas in sucrose.							
			Gas in glycerin.				No gas in glycerin.				Gas in glycerin.				No gas in glycerin.			
			Gas in dulcite.		No gas in dulcite.		Gas in dulcite.		No gas in dulcite.		Gas in dulcite.		No gas in dulcite.		Gas in dulcite.		No gas in dulcite.	
			+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−
Motile	Gel. not liq.	Indol	38	1	9	2	0	0	4	0	16	5	12	1	0	0	0	4
		V. P.	0	39	0	11	0	0	1	3	0	21	0	13	0	0	0	4
	Gel. liq.	Indol	0	0	0	0	13	5	68	12	2	0	0	0	0	0	0	0
		V. P.	0	0	0	0	7	11	40	40	0	2	0	0	0	0	0	0
	Raffinose		29	1	9	5	10	6	23	5	5	14	2	10	0	0	0	2
Non-motile	Gel. not liq.	Indol	7	0	17	1	0	0	0	0	8	0	0	0	0	0	0	0
		V. P.	5	2	16	2	0	0	0	0	0	8	0	0	0	0	0	0
	Gel. liq.	Indol	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		V. P.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Raffinose		5	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0

tose-positive, saccharose-negative organisms (B. communis) liquefied gelatin, and 90 per cent. of these organisms fermented glycerin, while only 58 per cent. fermented dulcite.

Seventy-six per cent. of the non-motile organisms fermented saccharose and all of these saccharose-positive organisms fermented glycerin, while 21 per cent. fermented dulcite also. Practically all of them produced indol and a positive V. P. reaction. All of the saccharose-negative organisms produced indol but none produced a positive V. P. reaction, so that they probably are the B. duodenale of Ford or the so-called B. acidi-lactici, the latter of which is variously stated as fermenting and as not fermenting dulcite. All of them fermented dulcite and glycerin.

These results would seem to show that glycerin is of considerable value in separating the liquefying from the non-liquefying organisms. This is also the opinion of Kligler, who found glycerin of value in differentiating the cloacæ and aërogenes bacilli. Rogers, Clark and Davis state that glycerin is fermented with difficulty by most of the members of the colon group. While this may be the case to some extent with B. communis, we have found that this substance is readily attacked by B. communior and B. aërogenes.

Kligler found that on subdividing the saccharose groups, on the basis of dulcite and salicin fermentation, respectively, that the saccharose-salicin groups gave better correlation with indol production, V. P. reaction and gelatin liquefaction than the saccha-

rose-dulcite groups. Rogers, Clark and Davis state that one half of 26 organisms classified as B. communis fermented adonite and that only about 25 per cent. of the organisms classified as B. acidi-lactici fermented it, while none of 16 organisms classified as B. communis were capable of fermenting this substance. According to Muir and Ritchie, B. aërogenes and B. acidi-lactici ferment adonite, while B. communis and B. cloacæ do not. Eyre in his text-book on Bacteriological Technique, gives all of these organisms excepting B. acidi-lactici as fermenting dextrin and all but B. aërogenes and B. acidi-lactici as fermenting glycerin. Practically all of our cultures fermented dextrin on rejuvenation if not on the first inoculation.

Classifying the cultures which we have tested by the use of dextrose, lactose, saccharose, dulcite, adonite and glycerin in the order named, we secure the numbers of various subtypes as shown in Table 3. Unfortunately tests for motility were not made during this part of the work; but, nevertheless, the results afford sufficient information to justify their consideration. The value of glycerin in separating B. cloacæ from B. communior and B. aërogenes is again shown, since less than one per cent. of the glycerin-positive organisms liquefied gelatin, whereas 90 per cent. of the glycerin-negative organisms did so. In this series about one half of the lactose-sucrose-positive and one fourth of the lactose-positive, sucrose-negative organisms fermented dulcite. Adonite showed similar results, while salicin showed a higher degree of fermentation. If we consider the sucrose-salicin-positive organisms as B. aërogenes and the sucrose-positive,

TABLE 3.

	Gas in lactose.								No gas in lactose.							
	Gas in sucrose.								Gas in sucrose.							
	Gas in glycerin.				No gas in glycerin.				Gas in glycerin.				No gas in glycerin.			
	Gel. not liq.		Gel. liq.		Gel. not liq.		Gel. liq.		Gel. not liq.		Gel. liq.		Gel. not liq.		Gel. liq.	
	+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−
Dulcite	74	83	0	1	14	21	31	133	0	0	0	118	0	0	0	3
Adonite	79	78	0	1	2	23	7	167	0	0	0	118	0	0	0	3
Salicin	140	17	1	0	17	8	173	1	0	0	7	111	0	0	0	3
	No gas in sucrose.								No gas in sucrose.							
Dulcite	26	46	0	2	6	50	1	3	0	0	0	51	0	0	0	2
Adonite	21	51	1	1	1	55	2	2	0	0	0	51	0	0	0	2
Salicin	27	45	2	0	48	8	4	0	0	0	3	48	0	0	2	0

salicin-negative organisms as B. communior, we find 331 of the former type and only 6 B. communior, whereas, in the previous test and in a later series with cultures from the same sources, where motility tests were made, we found eight or nine times as many B. communior as B. aërogenes.

In a fourth series of tests, the results of which are shown in Table 4, motilities were again run. Tests were also made for pigment formation, and all but one of the proteus types produced pigment, whereas very few of the B. cloacæ did so. The results are substantially the same as those of the second series shown in Table 2.

Summarizing the above results we arrive at the following conclusions:

Glycerin is of value in separating B. cloacæ from B. communior and B. aërogenes, but it is fermented by both of the latter types, and B. communis isolated from water frequently fail to ferment it.*

Dulcite and adonite are of little value in separating B. cloacæ from B. aërogenes and B. communior, and

TABLE 4.

			Gas in lactose.								No gas in lactose.							
			Gas in sucrose.				No gas in sucrose.				Gas in sucrose.				No gas in sucrose.			
			Gas in glycerin.		No gas in glycerin.		Gas in glycerin.		No gas in glycerin.		Gas in glycerin.		No gas in glycerin.		Gas in glycerin.		No gas in glycerin.	
	Voges and Proskauer React.		+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−
Motile	Gelatin not liquefied	No pigment	10	28	3	0	13	36	22	4	0	2	0	0	18	9	0	4
		Pigment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gelatin liquefied	No pigment	2	4	50	15	0	1	6	1	0	0	0	0	0	1	0	0
		Pigment	5	4	3	7	1	3	3	5	70	76	2	3	5	4	1	2
Non-motile	Gelatin not liquefied (No pigment)	Dulcite +	1	4														
		Dulcite −	0	8														
		Adonite +	4	7														
		Adonite −	0	2														
		Salicin +	4	8														
		Salicin −	0	0														
		Starch +	6	6														
		Starch −	0	1														
	Gelatin liquefied	No pigment								1								
		Pigment									1							

* In a study now in progress, where we have isolated, up to this time, about 40 cultures of lactose-fermenting organisms from 13 specimens of human feces, all of the cultures ferment glycerin.

References: Smith, *Centrabl. f. Bakteriol.*, v. 18, p. 494; MacConkey, *Jrnl. Hyg.*, v. 5, p. 333; v. 9, p. 86; Jackson, *Jrnl. Infect. Dis.*, v. 8, p. 241; *Jrnl. Am. Pub. H. Assn.*, n. s., v. 1, p. 930; Howe, *Science*, v. 25, p. 225; Ford, Rockefeller Inst., v. 2; Kligler, *Jrnl. Infect. Dis.*, v. 15, No. 1; Rogers, Clark and Davis, *Jrnl. Infect. Dis.*, v. 15, No. 3; Muir and Ritchie, MacMillan, 1913; Eyre, Saunders, 1913.

a majority of B. communis isolated from water fail to ferment these substances.

Salicin is frequently fermented by all of the lactose-positive organisms.

Raffinose is frequently fermented and dextrin usually fermented by all of the lactose-positive organisms.

The principal necessity at the present time seems to be the discovery of some simple test that will conclusively differentiate the colon and aërogenes bacilli. Motility examination, if properly conducted, can be depended upon for this purpose, but its use as a routine test is not in favor. Voges and Proskauer's reaction is promising, and it seems reasonable to suppose that some one of the starches may furnish the desired fermentative substance.

HEALTH SUPERVISION IN SMALL TOWN SCHOOLS.

School inspection is still in an incipient or imperfect stage and in small towns has hardly made much progress. Creighton Barker, New Milford, Conn. (*Journal A. M. A.*, April 15, 1916), calls attention to this point. The reasons for the nonattention in small towns and rural districts are many, chief of them being a somewhat narrowed administrative perspective and false economy. It also may be said that, owing to the usually superior housing, sanitary and other environmental conditions, it does not seem so imperative. There are more children, however, in rural districts than in the cities, as he shows by published statistics and nearly 18,000,000 children in schools are neglected as far as sanitary conditions are concerned. The term "medical inspection" is misleading; "health supervision" is a better term. Doctor Barker does not consider a school nurse an adequately trained person for inspector, but in connection with an energetic and competent physician free from political interference of any kind, a well trained nurse on duty and permanently employed is an ideal combination. Provisions for treatment should also be provided for. The laws of some states specify that examinations of female children, unless made by a woman physician, should be in the presence of the parents. While this at first appears like a stumbling block, it brings many mothers to the school, most of whom are impressed with the value of the supervision. The public press is a useful factor if properly used and the circulation of a health monthly or health pamphlet also spreads the good work and publicity generally is beneficial. In the district schools in the country complete school inspection is not so practicable. They are frequently remote from the centers and have but few pupils. Instituting a health day has been found to reach this problem with an encouraging degree of success. A Saturday in the early fall or spring is chosen, the farmers come in and bring in the children, the health supervision is explained and the examinations made. In one community health day combined with the meeting of the agriculture extension institute, the farmers quickly saw the parallel between raising better crops and better children and two highly constructive measures were mutually benefited. The question of expense is usually a formidable one. State legislation is required but in the small town an expense of $2 per child should, with economy, be sufficient. When one considers, however, the recent appropriation by a large Eastern state of $150,000 for health and $750,000 for the benefit of hunters and fishermen it would seem that the children's welfare is undervalued.

CONFIRMATORY TESTS FOR B. COLI IN ROUTINE WATER EXAMINATIONS.

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Read before the Laboratory Section, American Public Health Association, Rochester, N. Y., September 7, 1915

THE assumption that all bacteria which ferment lactose with the formation of gas are of intestinal origin is admittedly open to question and subject to at least hypothetical exceptions; nevertheless it constitutes a satisfactory basis for interpreting the results of bacteriological water-examinations.

Starting with this assumption, the formation of gas in a lactose-medium fermentation tube, under the usual conditions of water-examination, is sufficient proof that living bacteria from the intestinal tract of man or some of the lower animals are present in the water. However, since the lactose-fermenting bacteria themselves are considered non-pathogenic, their presence is significant only as indicating the probability that living pathogenic varieties of like origin may be present. Were it practicable to distinguish between the intestinal bacteria of man and those of the lower animals, much more definite significance would attach to the presence of those which are characteristic of human discharges, since the pathogenic bacteria of real importance in water-supplies are derived from human discharges. But, as such differentiation is not practicable, the next most important distinction to be made between the numerous varieties of lactose-fermenting bacteria is in respect to their viability outside of the animal body, those varieties of the most limited viability being obviously of the most dangerous significance. Upon this basis the lactose-fermenting bacteria may be divided primarily into two well-defined groups, the spore-forming and the non-spore-forming varieties.

So far as is known all the aërobic bacteria capable of fermenting lactose with the formation of gas belong to the non-spore-forming group, and may be considered collectively as the "B. coli group." On the other hand, so far as is known, the obligate anaërobes which ferment lactose with gas-formation are all spore-formers, hence more resistant than the B. coli group and not of the same significance as danger signals.

Because the aërobic or B. coli group are by far the more numerous in most waters, the formation of gas in a lactose medium fermentation tube has come to be considered as "presumptive" evidence of the presence of B. coli, and to be interpreted as signifying the presence of non-spore-forming intestinal bacteria, disregarding the possibility that the gas-formation may be due to spore-forming anaërobes. This "presumptive" test, which is commended by its simplicity, may be considered satisfactory provided the error in the "presumption" is insignificant in extent or, if more considerable, is constant or easily measurable.

The following statistical data relative to factors of variation in the presumptive test for B. coli are compiled from the records of approximately 19,000 bacteriological examinations made during the year 1914 in connection with a study of the pollution of the Ohio River.*

In these studies it has been our practice to confirm all significant presumptive tests to the extent of demonstrating the presence or absence of aërobic organisms fermenting lactose with gas-formation.

The procedure in making B. coli tests has been uniformly as follows:

Three portions of each sample are planted in lactose bouillon fermentation-tubes, which are incubated 48 hours at 37 degrees C., gas-formation being recorded at 24 and at 48 hours. After 48 hours' incubation, plates on Endo's medium are made from the smallest portion of each sample showing gas formation, however slight. If typical lactose-splitting (red) colonies develop on these plates within 24 hours the result is considered positive for B. coli. As a check upon the accuracy of this provisional diagnosis, a

* The data here cited will be presented in more detail and discussed more fully in a paper now in course of preparation.

TABLE I.

SUMMARY OF RESULTS AS TO DEMONSTRATION OF B. COLI IN CONFIRMING PRESUMPTIVE TESTS IN LACTOSE BOUILLON: TESTS CLASSIFIED ACCORDING TO SOURCE OF SAMPLES AND ACTIVITY OF GAS-FORMATION.

Gas-formation in presumptive test.*		Samples from river direct.			Samples from municipal supplies.		
24 hrs.	48 hrs.	No. of tubes showing gas as indicated.	Per cent. which these are of total.	Per cent. showing presence of B. coli.	No. of tubes showing gas as indicated.	Per cent. which these are of total.	Per cent. showing presence of B. coli.
+	+	9,914	61.4	97.8	208	32.2	90.8
±	+	2,163	13.4	96.7	87	13.4	82.8
±	±	139	0.8	68.3	39	6.0	69.2
−	+	2,755	17.1	91.5	128	19.8	78.1
−	±	1,179	7.3	62.2	185	28.6	58.6
Total...		16,150	100.0	93.8	647	100.0	73.8

* + signifies gas occupying more than 10 per cent. of closed arm.
± signifies gas occupying less than 10 per cent. of closed arm.
− signifies no gas.

typical colony is selected from every tenth positive plate for further identification. Of 1,852 colonies so selected, 96 per cent. have been identified as B. coli within the definition above given.

Where no typical colonies develop within 24 hours upon plates made from fermentation-tubes showing gas, further effort is made to recover B. coli as follows:

(1) Unless the plates are sterile, one or more colonies are selected and transferred to lactose bouillon fermentation-tubes. The formation of gas in these tubes, inoculated with aërobic plate colonies, demonstrates the presence of aërobic gas-formers, that is, B. coli.

(2) Plates are again made from the original fermentation-tube.

(3) A transplant is made from the original fermentation-tube directly to another lactose bouillon fermentation tube. If steps "1" and "2" have both failed to recover B. coli, plates are now made from this transplanted culture.

(4) At the same time a transfer is made from this tube directly to a third fermentation tube to carry over any anaërobic organisms which may be present. If all the above procedures fail to recover B. coli, and gas is still formed in this fermentation tube under anaërobic conditions, the inference is that gas-formation in the preliminary test was due to an obligate anaërobe.

If the whole procedure fails to demonstrate either aërobic or anaërobic lactose-fermenting bacteria it is concluded that the gas-forming organism originally present in the preliminary test tube has been overgrown or lost in the manipulations.

By this procedure we are able to recover B. coli in about two thirds of the cases where the first plates appear negative or doubtful; also, where the final result is negative for B. coli, we are able in a certain proportion of cases to demonstrate the presence of obligate anaërobic gas-formers.

The following tables show the results obtained in attempting thus to confirm a large number of positive presumptive tests, using both lactose bouillon and lactose bile.

The samples examined are divided into two contrasting groups, the first including all samples from the Ohio River and its tributaries, the second only samples from the municipal water-

supplies of Cincinnati and the adjacent cities of Covington and Newport, Kentucky. The river samples for the most part show high pollution, B. coli being usually demonstrable in amounts from one tenth to one ten thousandth cubic centimeter. The municipal supplies are all taken from the Ohio River. The Cincinnati supply is purified by short sedimentation, mechanical filtration and treatment with liquid chlorine; the Newport supply, after treatment with small amounts of coagulant and hypochlorite, is stored about twenty days; and the Covington supply is stored about thirty days, without other treatment. The Cincinnati supply shows a bacterial removal of over 99 per cent., while the other two supplies show well over 90 per cent. average removal.

Considering, for the present, only the examinations of river water, the percentage of presumptive tests confirmed varies in proportion to the activity of gas formation, the percentage of positive results being higher when gas-formation begins within twenty-four hours, and where the total amount formed within 48 hours is more than 5 or 10 per cent. It will be noted, too, that in most of these samples gas-formation is active. Altogether 92 per cent. show more than 10 per cent. gas at the end of 48 hours, and 76 per cent. show gas-formation beginning within 24 hours.

Comparing the results obtained in the examination of samples from the three municipal supplies, it is noted that for corresponding activity of gas-formation, the percentage of confirmed results is consistently lower; also that gas-formation is generally less active than in tubes inoculated with the raw river water. Only 65 per cent. of these samples show more than 10 per cent. gas in 48 hours, as against 92 per cent. of the river water samples; and only 52 per cent. show gas in 24 hours, as against 76 per cent. of the raw water samples.

In Table II are shown the results obtained, using lactose bile as the preliminary fermentation medium, in a smaller but otherwise comparable series of tests.

In general the results are similar to those shown in the first table, except that the percentage of confirmed results shows a less marked

TABLE II.

SUMMARY OF RESULTS AS TO DEMONSTRATION OF B. COLI IN CONFIRMING PRESUMPTIVE TESTS IN LACTOSE BILE: TESTS CLASSIFIED ACCORDING TO SOURCE OF SAMPLES AND ACTIVITY OF GAS-FORMATION.

Gas-formation in presumptive test.*		Samples from river direct.			Samples from municipal supplies.		
24 hrs.	48 hrs.	No. of tubes showing gas as indicated.	Per cent. which these are of total.	Per cent. showing presence of B. coli.	No. of tubes showing gas as indicated.	Per cent. which these are of total.	Per cent. showing presence of B. coli.
+	+	576	28.6	98.8	105	40.4	60.9
±	+	511	25.3	99.4	35	13.5	60.0
±	±	22	1.1	86.4	15	5.7	33.3
−	+	660	32.7	97.9	58	22.3	67.2
−	±	247	12.3	89.5	47	18.1	42.6
Total...		2,016	100.0	97.37	260	100.0	57.3

* + signifies gas occupying more than 10 per cent. of closed arm.
± signifies gas occupying less than 10 per cent. of closed arm.
− signifies no gas.

relation to the amount and time of gas-formation, which is more often delayed until the second day. In the series of river water tests the percentage of confirmed results is higher than with lactose bouillon, while in the tests of the municipal supplies the percentage is much lower, only 57 per cent. As applied to the river water the presumptive test in lactose bile is more specific and as applied to the treated waters less specific than in lactose bouillon. A comparison of lactose bile and lactose bouillon is, however, beyond the scope of this paper, except to show that the presumptive test is subject to similar variations in both media.

The larger proportion of unconfirmed results from positive presumptive tests in the examination of municipal supplies may be attributed, in part, to enfeeblement of the colon bacilli present in these waters, with attenuation of their lactose-fermenting properties; in part to the fact that in the treated waters the proportion of *anaërobic* gas-formers is larger than in the river water.

In fresh sewage the ratio of anaërobic lactose-fermenting bacteria to B. coli is small, probably less than 1 to 100. But the death-rate of B. coli in water is higher than that of the spore-forming anaërobes, hence as bacterial purification proceeds, the ratio of the anaërobes to B. coli increases, until, quite possibly, the former may even be in excess.

Analysis of the negative results from positive presumptive tests in the three groups of samples cited below illustrates such a progressive increase in the ratio of anaërobic gas-formers to B. coli and shows that the error in the presumptive test due to this cause is greater in the examination of treated than of raw water.

From the above-cited results it may be concluded that the so-called "presumptive test" for B. coli, whether in lactose bile or lactose bouillon, is subject to considerable variations in its specificity as indicating the demonstrable presence of B. coli.

Confirmation of the presumptive test, at least to the extent of demonstrating aërobic lactose-fermenting bacteria, seems justified, therefore, as adding materially to the significance of the results and as affording the only uniform basis upon which to compare waters of different character and history. Careful confirmation of the presumptive test is especially important in the examination of treated waters, where the error in the presumptive test is greatest.

It may be added, however, that in the confirmatory procedure, it is necessary to make a careful and conscientious effort to demonstrate B. coli, even when plating upon a differential lactose medium fails to show characteristic colonies; otherwise a significant error will be introduced in this step.

TABLE III.

NUMBER AND PER CENT. OF POSITIVE PRESUMPTIVE TESTS SHOWING ABSENCE OF B. COLI, PRESENCE OF OBLIGATE ANAËROBIC LACTOSE-FERMENTING BACTERIA.

Source of samples.	Total number of fermentation tubes showing gas, and plated out for confirmation.	Number and per cent. of these tubes showing B. coli absent, gas-forming anaërobes present.	
		Number.	Per cent.
Ohio River below Cincinnati: grossly polluted with fresh sewage	2,920	38	1.3
Ohio River above Cincinnati: sewage pollution from points over 100 miles upstream..	560	18	3.2
Cincinnati, Covington and Newport public water supplies.....	647	84	13.
Cincinnati, Covington and Newport public water supplies, using lactose bile.....	260	37	14.

REPORT OF THE COMMITTEE ON MEDICAL INSPECTION OF SCHOOLS.

WM. H. PETERS, M. D.,
Chief Medical Inspector, Cincinnati, Ohio, Chairman.

Read before the Public Health Administration Section, American Public Health Association, Rochester, N. Y., September 8, 1915.

SYSTEMS of school medical examination in different parts of the United States vary from the most rudimentary ones to the more complex organizations designed to safeguard every phase of the child's life.

Boston blazed the way in 1894 when she initiated school medical inspection in the hope of checking the communicable diseases common to childhood. Chicago began in 1895; New York in 1897 and Philadelphia in 1898. During the past decade the spread of the movement from the greater cities to the smaller ones has been remarkable.

A survey made during the school year 1910–11 by the Russell Sage Foundation showed that in 1,038 cities and towns, or nearly 90 per cent. of the municipalities which have school systems, 443 cities and towns, or 43 per cent., had organized systems of medical inspection of school children.

In a recent investigation conducted by the United States Bureau of Education, reports were received from 1,467 cities and towns in the Union. The number having school inspection was 750 or 51 per cent.

In the year of 1909 there was legal provision for medical inspection of school children in three states. In 1914 school medical inspection was mandatory in seven states and permissive in thirteen.

The replies to recent questionnaires sent out by the United States Bureau of Education would indicate that 80 per cent. of the 1,467 cities and towns reporting employed school physicians and that the total number of physicians employed was approximately 2,500.

We are certainly indebted to Lillian D. Wald who was the first to recognize the importance of follow-up work.

The introduction of the trained nurse into the service has been rapid following an experimental demonstration of one month in 1902 by Lena L. Rogers, whose services were volunteered by the Henry Street Nurses Settlement of New York City.

According to the investigations conducted by the Russell Sage Foundation in 1911, there were 415 school nurses employed in 102 cities and towns.

In a summary prepared by the Bureau of Education I note that in the beginning of 1915, 923 nurses were employed in 268 cities and towns reporting.

A system of records is maintained in 585 cities.

I shall not take up in my report, the actual results achieved by school medical examination either for the detection of communicable diseases or the correction of physical defect which interfere with school efficiency. It is impossible to get definite statistical evidence.

There can be no doubt but that much has been done in preventing the spread of communicable diseases among school children. With improvements in the systems, placing medical inspectors on full time, by the adoption of standard methods, and a continued enthusiasm, we should see an appreciable drop in the morbidity of diphtheria, scarlet fever, measles, mumps and whooping-cough.

Educators are a unit in declaring that, as a result of school medical examination, the physical and mental standards of the children have been raised very materially. American cities offering statistical reports regarding defects treated, show that anywhere from 10 to 60 per cent. of the children needing treatment were benefited. While a certain irreducible minimum of defectiveness must remain uncorrected, it seems certain that this minimum has not been reached. Let me give you a few concrete examples of the effectiveness of school medical examination.

In New York City during the years of 1913 and 1914, 55,163 children were discovered with defective vision. Of this number 27,613 or 50 per cent. were benefited by glasses. During the last two years, in our own city, 3,475 children attending public and parochial schools, whose vision was defective, were noted by the school

physicians. Seventeen hundred and seventy-nine of these children or 51 per cent. were wearing glasses on or before June 20, 1915.

Seventy-three thousand, one hundred and eleven school children with enlarged tonsils were reported by the inspectors of New York City in 1913 and 1914. Of this number 18,507 or 25 per cent. received operative treatment.

Surgical interference was the method employed in treating 1,075 or 35 per cent. of the 3,033 school children who had diseased tonsils and adenoids in Cincinnati during the last two school years.

Ten years ago little or no attention was paid to mouth hygiene of school children, and still there was probably no single defect that contributed more to absence from school than the carious tooth. Now we have systematic dental inspections in 400 cities and towns. Free dental clinics for indigent school children were in operation in 130 American cities in the beginning of 1915.

The movement owes its rapid development to a universal appreciation of the importance of oral hygiene and in particular to the findings of school physicians employed in the work of school medical inspection.

Along with the treatment of diseased teeth, we find the dentists at the head of an educational propaganda which is overwhelming teachers, parents and children with the importance of prophylaxis.

The recognition of incipient and potential cases among school children plays an important rôle in the control of tuberculosis. In America comprehensive systems embracing thorough physical examinations are far from general. However, in many of the larger cities, we have regular examinations beginning with children in the lower grades and as a result we have crystallized a sentiment in favor of handicapped children.

Providence, Rhode Island, was the first American city to recognize the importance of fresh air treatment for its blighted children. An open air school was established in 1908. At the present time there are over five hundred open air schools for anæmic and pretuberculous children in 250 cities in the United States. In many of our cities we see hospital schools for tuberculous children. Summer camps have followed in the wake of medical inspection. I know that in our own city, the Anti-tuberculosis League would not have conducted its magnificent summer camp during the past three years had it not been for the survey of 1913 in which 36,438 public school pupils were examined for evidences of anæmia and tuberculosis, by the school physicians.

As a general conclusion from investigations made in this country by school physicians it seems fair to place the probable number of mal-nourished children in American cities at 10 per cent. of the school population.

I am firmly convinced that it was a double appeal, suffering childhood and the ignorance of some parents, that prompted our good women, headed by Miss Ella Walsh, to organize the Pioneer Penny Lunch Room in the Jackson School during the month of April, 1908. The scope of the work has not only been extended in Cincinnati, but school feeding constituted a part of the elementary school system of 70 American cities in 1913.

As a phase of child welfare, the Little Mothers Leagues occupy a position of prime importance.

The intelligent interest displayed by the girls who avail themselves of this opportunity to learn the principles of personal hygiene, home sanitation and the care of younger children, is astonishing; their expression in the work inspiring. Since the organization of the first League in New York City four years ago, some provision is made for this kind of instruction in 73 cities.

In New York City health leagues have been established whereby the children themselves, through their own organizations, not only keep themselves clean, and as far as possible free from disease, but also see to the correction of physical defects of the other children in their classes. Dr. Josephine Baker affirms that the work has been a great success. It has lessened the amount of work the nurses were compelled to do and has aided not only in the prevention of disease, but in increasing the percentage of corrections of defects.

We find that the course of instructions outlined by the American Red Cross has been very valuable in teaching high school girls elementary hygiene and home care of the sick.

According to Miss Jane DeLano the course is gaining favor in many large cities. We believe

that all girls should have the benefit of a few lessons in home nursing; not that we wish to encourage them to take up nursing as a profession but rather that they should be able to assist intelligently in the home during time of illness.

During the past two years we have been fortunate in securing for this work the services of the director, whose services were volunteered by the local chapter of the Red Cross Association.

I might say more but I feel that I have already trespassed upon your time.

Those of us who are engaged in the work must feel that it is a splendid privilege to participate in a movement which is revolutionizing old traditions of education.

Children are responsive and as a result of a world-wide endeavor to conserve and promote the health of school children, we have awakened a hitherto unknown responsibility of parents for their children; we have crystallized public sentiment in favor of a better race.

In the school lunch-rooms children learn to appreciate the value of good food and, as a result, knowledge in the selection and preparation of wholesome food is disseminated in the home.

Years ago when standards were low we were content to leave the sick, the sightless, the crippled, deformed and mentally deficient children in the same class-room with normal children. Now, as a part of our duty, we are recommending that these handicapped children should be taught along special lines that will reduce the effect of their handicap and enable them to become useful citizens. With what result? We have hospital schools for the crippled and deformed in several states; special classes and schools for those who are deficient mentally, in larger cities, schools for the blind. Conservation of vision classes for children who have progressive myopia, opacities of the cornea and deformities of the lens, have been established in Boston, Cleveland, Toledo and Cincinnati.

Psychologic clinics for the proper classification of retarded school children were established in 33 American cities early in 1915.

This is an opportune time to say a word about the examination of children of pre-school age. Encouraged by the results that we were getting in the schools, Dr. Wade MacMillan, upon his request, was encouraged to organize a Bureau of Child Welfare, which should be under the supervision of the health officer and his assistant. Its purpose is to supplement school medical inspection by a thorough medical examination of children during the first six years of child life.

The staff consists of an experienced surgeon in orthopedics and the surgery of childhood; a physician of experience in the diseases of children; a specialist in the diseases of the eye, ear, nose and throat, and a school nurse. All members of the staff serve without pay.

The Board of Education authorized the use of school houses for meeting places and volunteered the coöperation of principals and teachers.

The Bureau is not a clinic, nor is it designated for any class. It is for children, just as the public schools are for children. The Bureau aims to create a health sentiment. The presentation of children is purely voluntary. If defects are found, the mothers are advised of them. No medical or surgical treatment is offered. Parents are referred to their family physician, clinics or hospitals.

Kindergarten teachers in the school serve as social workers. They take the histories and do follow-up work.

After working from February until June in one school conducting two conferences each week, the promoters found that the district was not nearly exhausted. A tabulation of the pathologic conditions found will be made after the doctors have finished in the district. The generous response of the parents seems to be a good argument for the continuance of such work. During the coming school year we expect to have four groups of examiners in as many districts. As far as we know this Bureau is the first of its kind established in America.

While we are reviewing the corrective work that is being carried on in so many cities and towns, we must not lose sight of the educational propaganda conducted by the various agencies who are trying to promote the health of school children.

Women with special qualifications are being engaged as lecturing school nurses. In many states, county and district nurses are undertaking this work by which children in public and church schools are instructed in personal and home hygiene, the prevention of tuberculosis and other communicable diseases, and first aid to the sick and injured.

REPORT OF COMMITTEE ON VENEREAL DISEASES.

W. F. Snow, M. D., *Chairman.*

Read before the Public Health Administration Section, American Public Health Association, Rochester, N. Y., September 8, 1915.

IT HAS been the custom of the American Public Health Association to appoint from time to time committees instructed to report upon unsolved problems of investigation or administration of general interest to its members. Sometimes there have been committees whose work has extended over a series of years, a progress report being submitted for discussion each year. More frequently these committees have reported and been discharged, a new committee being appointed in subsequent years when their respective subjects have again come to attention through new discoveries, or the development of original methods of administration. In this latter way the reduction of venereal diseases has been the subject for report a number of times, the last committee having reported at the Milwaukee meeting in September 1910.

Your present committee, therefore, deems it proper to consider the report of 1910, as a summary of the prevailing opinions prior to that date, and to present its material as a progress report with certain recommendations for your consideration.

The 1910 report was submitted by a committee of which Dr. George M. Kober was chairman. The other members were, Drs. J. R. Kean, Charles N. Fiske, J. W. Kerr, Eugene H. Porter, George W. Goler, Juan Brena, Gardner T. Swarts, the latter having recommended the appointment of the committee in his address as president of the Association in 1909. These names alone are sufficient guarantee of the care with which this report was prepared. It was adopted by the Association and published in the 1910 proceedings. The report emphasized five major factors in the public health campaign against venereal diseases:

I. The recognition, study and control of the prevalence of gonorrhea and syphilis by the State Boards of Health, as communicable diseases dangerous to the public health.

II. An educational campaign for parents of all social classes and children of all ages and sexes.

III. Advocacy of temperance on account of the relationship between alcoholism, venereal diseases and insanity.

IV. Advocacy of personal cleanliness and venereal prophylaxis for those whose carnal appetites cannot be controlled by the agencies of moral prophylaxis.

V. Advocacy of early marriage.

Marked progress has been made along practically all the lines of endeavor specified under each of the major headings noted above. There is appended herewith the detailed recommendations of the committee, together with illustrative material showing the advances made in their application during the past five years.

Since these diseases belong to the group in which both the individuals infected and those exposed must intelligently coöperate with the health authorities, if satisfactory results are to be obtained, it is obvious that popular education has been and continues to be a necessary antecedent to administrative action. The general educational work emphasized by the committee of 1910 has been, in large measure, established. There remains the necessity for directing the attention of the public to specific measures which each community should adopt.

It is the concensus of opinion of those who have seriously attempted to establish protective measures against venereal diseases, that certain moral, social and legal factors, as well as medical factors, must be considered in any successful plan for effecting a considerable reduction in their prevalence.

In attacking any disease from which he is attempting to protect the public, the health officer first secures, through surveys, physicians' reports and personal interviews, all the information obtainable upon existing cases, and arranges for their treatment and supervision under conditions which will preclude transmission. He then proceeds to carry out such additional measures as are calculated to protect the non-infected portion of the population under his charge. Looking toward the future, he finally

endeavors to secure those community conditions, or standards of personal hygiene or conduct which will prevent the recurrence of the disease in the community.

The following tabulation of measures directed against syphilis and gonorrhea is arranged for discussion in accordance with the procedure just outlined.

A digest of various plans in operation, arranged under these headings, is appended:

I. Management of Existing Cases.

1. Provision of Public Health Laboratory equipment for free examinations for evidence of syphilis and gonococcus infections.
2. Provision of ample facilities at public expense for clinical diagnosis and advice in cases of syphilis and gonorrhea.
3. Provision of adequate treatment for ambulatory cases, free of cost to those requiring public assistance.
4. Provision of adequate hospital facilities for syphilis and gonorrhea patients in all stages of their diseases, in general hospitals.
5. Extension of hospital social service work to syphilis and gonococcus infection cases.

II. Prophylaxis.

1. Compulsory notification of syphilis and gonococcus infections to the health departments for proper action in protecting the public.
2. Instruction of patients in measures for the protection of others.
3. Promotion of continence as the greatest factor in personal prophylaxis.
4. Dissemination of general information concerning syphilis and gonorrhea and their methods of transmission.
5. Utilization of approved medical prophylactic measures under proper supervision.

III. Measures Contributing to the Reduction and Ultimate Eradication of Syphilis and Gonococcus Infections.

1. Repression of prostitution through law enforcement.
2. Provision of ample facilities for wholesome play and recreation; and elimination of environmental and social conditions, which encourage extra-marital sex relations.
3. Elimination of alcoholic drinks.
4. Promotion of sex education and standards of personal conduct which are in keeping with high moral principles.
5. Encouragement of early marriage after maturity and promotion of economic and social conditions conducive thereto.

Your committee believes that the practicability of effectively combating venereal diseases has been demonstrated, and that this work should no longer remain in President Sedgwick's list of conspicuous failures in public health. The people have accepted the typhoid death-rate as evidence of good or bad sanitation of a given community. The individual patients are not known to the public or condemned, even though many of them might be censured for having failed to protect themselves; and every effort is made to restore them to health while protecting the public from their infection. Venereal diseases have not been so accepted and recorded largely because of the moral stigma attached to the individual victim. Every effort should be made to direct attention, as in typhoid fever, to the community responsibility. An unusually low typhoid morbidity without explanation is a liability rather than an asset to a community. It is probable that, as our cities and states frankly acknowledge the existence of syphilis and gonorrhea, and provide for combating them, the same attitude will develop toward them.

It will be readily seen that your committee, after reviewing the developments of the past five years, has practically restated the recommendations of the earlier committee. This shows how far ahead of application our scientific knowledge of these diseases has been.

In order to actively stimulate progress in this important field, it is recommended that a Committee on Venereal Diseases be continued for several years, with instructions to bring in a report of notable progress each year.

William F. Snow, Chairman,
J. H. Landis,
Powhatan S. Schenck,
J. N. Hurty,
W. A. Evans.

REPORT OF COMMITTEE ON REFUSE COLLECTION AND DISPOSAL.

SAMUEL A. GREELEY, *Chairman*, RUDOLPH HERING, WM. F. MORSE, E. R. CONANT, W. T. KNOWLTON, *Committee*.

Sanitary Engineering Section, American Public Health Association, Rochester, N. Y., September 10, 1915.

SINCE the last convention of the association in the fall of 1914 there have been few developments in the practice of refuse collection and disposal. Such new work that would be of interest to the association is briefly reviewed as follows:

New Plants.—One of the most interesting developments of the year has been the construction of garbage reduction plants for the cities of Schenectady, N. Y., and Akron, Ohio. These plants are for municipal operation. They are among the smaller plants of this type. The city of Los Angeles has taken up the reduction of garbage, having awarded a contract by which the city receives fifty-one cents for each ton of garbage delivered to the contractor, but the city must furnish all water used at the work, free of cost to the contractor. The old pig-farm has been abandoned.

A rubbish sorting and incinerating plant is under construction at Columbus and the high temperature refuse incinerator at San Francisco has been in operation on a test basis. A considerable number of smaller towns have installed garbage furnaces using an auxiliary fuel.

Investigations.—Two interesting investigations have been made in the city of New York. One consists in a large scale experiment on house treatment and collection of refuse. The tractor-trailer system has been adapted to collection work. The other investigation relates to the elimination of odors from garbage reduction works, the work having been carried out at the Barren Island Reduction Plant.

In Chicago, although no technical bureau has been established, investigations have been continued on the mechanical analysis of refuse.

In Milwaukee, the use of motor trucks for the collection of ashes has been giving an extended trial.

Specifications.—Of special interest to municipal officials contemplating the installation of high temperature incinerators are two court cases at Atlanta and San Francisco. In these cities the city officials have refused to accept the plants built, on the basis that the specifications have not been fulfilled. In Atlanta the decision has been in favor of the contractor. No decision has as yet been reached in San Francisco.

Standard Forms.—Although this committee has not actively made use of the standard forms of statistics of municipal refuse, it is good to know that the form has been published by the American Society of Municipal Improvements in their leaflet of standard forms which they have adopted. Copies of this leaflet may be secured from Charles Brown, Secretary, 702 Wulsin Building, Indianapolis, Indiana.

Mr. Knowlton of our committee has tabulated statistics from a number of towns using the standard forms.

General.—The instances noted above include the principal sources of information in refuse disposal work which have developed during the past year. Detailed information can be secured by writing to each municipality.

In the report of the committee last year, attention was directed to the practice in smaller communities of buying garbage plants on contractors' specifications. This practice is again condemned by the committee as resulting in poorly built plants of short life, which are unsatisfactory in operation.

Book Reviews.

Royal Commission on Venereal Diseases. *Final Report of The Commissioners. Presented to both Houses of Parliament by Command of His Majesty. T. Fisher Unwin, Limited, London, W. C. 1916. Price, 1s. 11d.*

The final report, recently received in this country, of The Commissioners of the Royal Commission on Venereal Diseases appointed in 1913 to inquire into the prevalence of venereal diseases in the United Kingdom of Great Britain is of high importance. This Commission comprised such representative men and women of England and was given such powers of calling before it the ablest physicians and military, hospital, and public health authorities, that its general conclusions warrant reading in full.

"Our task is now ended. We have endeavored to make clear the grave and far-reaching effects of venereal disease upon the individual and the race. The evidence we have taken proves conclusively that these effects cannot be too seriously regarded, and that they result in a heavy loss, not only of actual but of potential population, of productive power and of expenditure actually entailed. For reasons largely due to the special character of these diseases and the moral stigma attaching to them, it has been found impossible to present accurate estimates of the degree of their prevalence. We have, however, been able to arrive at some important conclusions in regard to their relative prevalence socially and geographically.

"The medical evidence establishes the fact that, by early and efficient treatment, these diseases could be brought under control and reduced within narrow limits. It is beyond doubt that, on the one hand, treatment is in most cases unduly deferred, and that, on the other hand, adequate facilities for the best modern treatment do not exist. Recent discoveries have armed the medical profession with means of combating venereal disease which were unknown in the past. The object must be to bring these means to bear upon every infected person at the earliest possible moment.

"We are convinced that this object can be accomplished only by the action of Government directed to the solution of a great national problem. We have recommended no drastic remedies, and except in certain special cases we have not advocated compulsion in any form. The measures which we proposed contemplate extended facilities for bacteriological diagnosis combined with the provision of adequate and skilled free treatment, the cost of which, we consider, should fall mainly upon the national exchequer. These measures, if adopted without delay, will go far to remove the grave evils which our investigations have brought to light. At the same time, we hope that the knowledge of the gravity of venereal disease which our report will impress upon the public and the teaching which we recommend will have the effect of inducing infected persons to make full use of the facilities for treatment which, we trust, will be provided forthwith.

"The terms of our reference precluded consideration of the moral aspects of the questions with which we have dealt. We are, however, deeply sensible of the need and importance of the appeals to conscience and honor which are made by the religious bodies and by associations formed for this purpose. We believe that these appeals will gain force if the terrible effects of venereal disease upon innocent children and other persons who have no vicious tendencies are more fully realised. Our evidence tends to show that the communication of disease is frequently due to indulgence in intoxicants, and there is no doubt that the growth of temperance among the population would help to bring about an amelioration of the very serious conditions which our inquiry has revealed. We are also conscious of the fact that overcrowded and insanitary dwellings indirectly contribute to the spread of disease, and from improvements in this direction we should expect some diminution of its prevalence. Improvement in the moral standard and in social conditions may, however, be slow, and we are convinced that upon ample provision for early treatment and readiness to take advantage of it any real progress toward the diminution of these diseases as a most baneful factor in the national life must mainly depend.

"We recognise that the measures which we proposed will need for success more than legislative and administrative measures taken by Government. Continuous and consistent efforts will be required to keep the complex

question of combating venereal disease before the public mind, and to secure the constant assistance of voluntary agencies concerned in prevention and rescue work. We hope that the National Council established with this object will become a permanent and an authoritative body, well capable of spreading knowledge and giving advice in regard to this question in its varied aspects, and that it will be recognised as such by Government.

"Our report must issue at a time when all public activities are preoccupied in fulfilling the manifold needs of war. We are conscious of the disadvantage thus arising, and we feel that there is some risk that our recommendations may not receive the immediate attention which their national importance demands. We desire, therefore, to place on record our strong opinion that the conditions now existing and those which must follow on the conclusion of the war imperatively require that action should be taken without delay. There is no reason to believe that the percentage of infection in the naval and military forces is now greater than in normal times; but there can be no doubt that the total of infected persons has increased. The military authorities are doing their utmost to provide treatment; but the civil population requires corresponding measures, and all experience shows that after a war an excessive incidence of disease is certain to occur, even in districts previously free. In order to meet present and future conditions, it is essential to make provision, and no time should be lost.

"Lastly, we wish to lay stress upon the needs of the future. The diminution of the best manhood of the nation, due to the losses of the war, must tell heavily upon the birth-rate—already declining—and upon the numbers of efficient workers. The reasons for combating, by every possible means, diseases which in normal times operate with disastrous effects alike upon the birth-rate and upon working efficiency are, therefore, far more urgent than ever before. Now and in the years to come the question of public health must be a matter of paramount national importance, and no short-sighted parsimony should be permitted to stand in the way of all means that science can suggest and organization can supply for guarding the present and future generations upon which the restoration of national prosperity must depend."

These general conclusions are preceded by a series of thirty-five specific recommendations falling under legislative, administrative, and educational heads. The report contains 191 pages and is full of interesting data on the prevalence, effects, and means of alleviation or prevention of these diseases. One is impressed throughout the report with the need for considering the venereal diseases from the national point of view. Repeatedly, the suggestion is made that the national treasury should pay 75 per cent. of the costs and the local community 25 per cent. Emphasis is placed on not limiting treatment to those who obviously cannot pay a private physician, or to those who reside in a particular area. Evening clinics with hours convenient to the working classes and the free provision of salvarsan or its substitutes at the discretion of the local authorities are advocated. The report states that "the obligation should be impressed on all doctors who treat syphilis and gonorrhea in institutions or privately to hand cards of instruction and warning to their patients." The use of general hospitals and dispensaries for providing the institutional treatment, rather than special institutions, is urged. Effective warfare on medical quacks and their advertising is proposed.

In brief, all the best measures which our American cities and states collectively are trying out are presented. The provision of adequate facilities for early diagnosis and treatment is chosen as the most promising line of attack. The reporting of venereal diseases is not recommended until experience has been gained in operating the improved facilities for diagnosis and treatment. But the recommendations include amendments to the registration laws providing for confidential registration of causes of death, and for "privileged communications" by the physician to "a parent, guardian or other person directly interested in the welfare of a woman or man, and with the object of preventing or delaying a marriage with a person who is in an infectious condition from venereal disease." Especial importance is attached to the establishment of a uniform system of records for venereal diseases in hospitals, statistics of the number of patients for whom salvarsan is provided at public expense, and similar data.—*Dr. Wm. F. Snow.*

Health Department Reports and Notes.

REPORTS.

Porto Rico.

The report of the Director of Porto Rico for 1915 represents a year of hard work under the most difficult conditions, made even more so by the lack of sufficient force and funds. The sanitation work on the island is in a period of formation and transition, a fact which throws on the board a great responsibility in the preparation of sanitary regulations and necessitates frequent amendments to meet new conditions. The responsibility of enforcing these regulations was left to the subordinate officers and the report of each is compiled almost verbatim in this report.

Unfortunately there has been a reduction of almost 50 per cent. in the appropriation for this service since 1911, as a natural consequence of which, the mortality rate has increased from 18.44 per 1,000 during 1913–1914, to 19.78 for 1914–1915. Yet it is of interest to note that this mortality rate is lower than at any time prior to the organization of this service.

In remarking on the medical service of the island, particularly in connection with attendance on the sick-poor, it is stated that more than half of the persons who die in the island are not seen by a physician either before or after death. To a large extent this is due to the difficulty in traveling in the interior.

Nothing so well exemplifies the result of cutting down the appropriation as do the returns from malaria. Due to a lack in funds, the mosquito eradication campaign, begun in 1911, was stopped. In 1911 the mortality was 1,208; 1912, 1,005; 1913, 517; 1914, 719.

It is seen from the more reliable statistics of certain cities that an appalling situation is arising through the increase in pulmonary tuberculosis. In the cities of San Juan and Ponce the number of deaths from tuberculosis of the lungs is as follows: 1912–13, 1,535; 1913–14, 1,483, 1914–15, 1,788. This situation cannot be relieved but by the appropriation of funds for a more complete care of cases. No sanitarium on the island will admit cases in the most advanced stage, and since this is the most effective stage for the transmission of this disease one can realize the importance of such appropriation.

It was recognized that it was of the utmost importance to the public health that a careful study should be made of its water supplies. Since it was impossible to carry this out on a large scale, it was decided to investigate the existing supplies in four cities. This was done after overcoming innumerable natural difficulties. A large part of the report is devoted to the report of the survey of the waterworks of these cities. Suffice it to say that the bacteriological reports showed that three of these water supplies, fed from the same source, were polluted, while the fourth was free from suspicion.

Of the regulations promulgated during the year, the three most important were those governing dairies and milk supply, bakeries and the sale of bread, and the protection of foodstuff. The director himself assumed the responsibility of inspecting the bread and bakeries, and in general conditions have improved. The greatest difficulty seems to be the insuring of the use of pure yeast. Some of the specimens submitted for examination were found to contain the organism which is believed to be the cause of sprue.

The infant mortality is 141 per 1,000 births, the principal fatal diseases being diarrhea and enteritis, conjugal debility, and infantile tetanus. Little of value can be gleaned from the morbidity or mortality reports, except possibly in the cities, since the reporting of a case of sickness is too often neglected, and, too, the diagnoses of many of the local doctors is often at fault.

All in all it represents a gigantic struggle against disease and ignorance, the degree of which can only be realized upon reading the report itself. The director and his staff are to be congratulated on doing what they have done, and it is to be hoped that they will soon have sufficient money so that they may realize in a more tangible way the success of their efforts.

New Bedford, Massachusetts.

New Bedford's report for 1915, though brief, gives evidence of progressive public health work. The health expenditure is liberal, totalling to over seventy cents per capita for the usually recognized health department functions. Such an expenditure is clearly called for in view of the fact that this city of some 110,000 population has all of the ordinary large city problems to meet. The death-rate is given as 15.67. The city has paid special attention to tuberculosis, as evidenced, for example, by the payment of over a third of the above allowance for maintenance of the local sanatorium. Attention is now being paid to infant welfare, the Federal Children's Bureau having recently made an investigation into the causes of the city's high infant mortality rate. As yet there is but one public health nurse under the health department, who divides her work between infant hygiene and tuberculosis. It is evidently desirable that even greater emphasis be placed upon the instructional work of nurses in comparison with printed matter, which must necessarily fail to affect even superficially a large proportion of the inhabitants of a large industrial city of mixed population.

An epidemic of 23 cases of smallpox, nearly half fatal, occurred, costing the city $8,000, or $350 per case. Owing to the efficient vaccination of school-children, however, not a single case developed in the schools.

Three thousand eight hundred forty-seven dollars was spent for ophthalmia neonatorum work; certainly a surprising amount taken in connection with the 291 cases of sore eyes reported.

In connection with nuisances the board well advocates the coöperation of the police in the abatement of those minor nuisances which could be more efficiently dealt with by them.

The report could be improved by the addition of a page showing the organization of the department and by the conversion of the index into a table of contents. Mortality is tabulated by causes, but one misses the death-rates for important causes, while it is difficult to imagine the value of the present form of detailed tabulation by age, sex, and month.

Long Branch, New Jersey.

It is with a sense of pleasure that we review this report which marks the second year of progress in the aggressive work for health for 1915 of this little city of some 15,000. The first report of this city, reviewed in the November JOURNAL, clearly indicated the constructive trend of the health control of this community, and the work has been carried on with increasing efficiency and a constant broadening of endeavor.

As is the case with most small cities, the excellence of whose health work has demanded more than local attention, the health officer of the previous year, Mr. John Hall, resigned his position in July 1915 for a more responsible and better salaried position elsewhere. His successor, Mr. Nels A. Nelson, is carrying on the work of the board in the same capable manner.

It is stated that a great deal of time is spent in the abatement of nuisances, chiefly those of neglected cesspools and privies, accumulations of manure and improper disposal of wastes. This state of affairs is unfortunate in that it cuts into time which could be more profitably spent in other directions. As is suggested, the laying of sewers in all streets and an improved system of waste collection are necessary to properly remedy such conditions.

Nevertheless, nothing has been allowed to interfere with the carrying out of methods essential to the maintenance of community health, with the very satisfactory results that the infant mortality death-rate is the lowest on record, 89 per 1,000 births; that the general death-rate is the second lowest in the last six years of which there is data, being 14.5 per 1,000 for the permanent population or 10.6 for the yearly average population of 20,000; that the birth-rate continues to be above the average; that excluding deaths from tuberculosis, only three of the 212 resident deaths occurred from the so-called preventable diseases, and nineteen only were due to preventable disease, tuberculosis included; that with the exception of a few dairy scores, the milk supply is better than at any previous time.

The board of health is justly indignant over its financial situation. Of the total appropriation for this city's expenditures of $243,524, the board of health received $2,500 or 1.02 per cent. or a per capita expenditure of 17.1 cents, or, reckoned on the basis of the average yearly population, of 12.5 cents. This is too low, and the health officer is to be greatly commended on the excellent results he has accomplished in spite of this discouraging fact.

In outlining the work of the future, Mr. Nelson asks for a board of health physician for diagnostic purposes; the placing of the work of recording and collection of vital statistics in the office of and under direct control of the board of health; the replacement of the practice of fumigation for the more modern and efficient practice of thorough mechanical cleansing; a campaign against polluted wells and cesspools and privies abutting on the property of the public sewer; an ordinance requiring meat inspection, and appropriation for work of fly and mosquito extermination within the city limits.

Naturally, in establishing a modern system of health control in a small city, certain aspects of the general problem must be at first overlooked, both because they seem less important than other factors and because of the enforced limit of expenditure. It is to be hoped that, with interest created in the public mind for an increased health appropriation, the Long Branch board of health will soon be able to include in its activities work on the control of food supplies, infant hygiene work and greater laboratory facilities.

Springfield, Massachusetts.

The report of the Springfield health department for 1915 opens with an excellent general discussion of conditions and aims such as is necessary for ready comprehension of the work in a city of the 100,000 class, but is too rarely found in their reports. A comparison is made between the per capita cost of the health work, which was 31.8 cents, and the results obtained as in a degree indicated by the death-rate of 14.67. Where health work is bringing as tangible results as it does in Springfield, vague generalities about "general improvements in health conditions" are well replaced by specific statements and figures. The board aptly says that "we must take into consideration the value of lives saved in drawing conclusions as to value received for money expended," but wisely refrains from attempting the sort of problematical calculations, involving dollars and lives, which have led some health officers into unconvincing hyperbole. Credit, moreover, is given to certain health agencies, not under the control of the health authorities, with which it is evident that goodly coöperation exists. An idea which is impressing itself increasingly upon observant health officers is expressed in the following paragraph:

"Good health, at middle age, means intelligent and proper care during the developmental and early period of life. Lessened mortality rates at present are due chiefly to the extensive work on the better care of infants and mothers and the better control of contagious diseases. The percentages of deaths in the age periods above fifty years are not diminishing. In certain diseases they are increasing, and it is in the prevention of the degenerative diseases in middle life that the broader activities of health departments are concerned."

Again, there is real constructive suggestion in the following: "Building for the future is as important in health work as any other, and a field of operation which is most likely to be valuable in the future is connected with the children of the public schools. A sound physical foundation becomes necessary if the educational system is to produce its best results. Economically considered, it is highly important that the children, who leave the public schools in such large numbers at sixteen years of age, should carry with them definite ideas of the value of good health and the way in which it is secured."

And this: "While the abolition of poverty and ignorance, with elimination of degenerates and defectives, may never be accomplished, there is much to be done in lessening these untoward social conditions, which should receive earnest and willing support, and those features of the social uplift which are most directly associated with improvement of the public health are legitimate functions of health department work."

Regarding the balance of power between central and local authorities, the report has the following to say: "Referring to the administrative control of public health, it may be noted that at the time when the State of Massachusetts is entering on a campaign for a central control of public health work through the reorganized State Department of Health, the United States Public Health Service is advocating more authority for local boards of health, and says that health problems are to a great extent local in nature and should be under local control."

Little criticism can be made of the clear discussion and ample numerical data presented in the report. It would be advisable to follow standard practice by adjusting previously estimated populations in accordance with the recent census. Deaths are tabulated in a much extended table the detailed items of which can yield little of practical value. It may be suggested that such items can effectively be utilized only in shorter tables directed to specific purposes. A table of contents would enhance the appearance and convenience of the report.

Hartford, Connecticut.

The 1915 report of this city of 108,969 population shows a decrease in the crude death-rate from 17.56 to 17.50 per 1,000. Correcting this by excluding the non-resident deaths, the rate per thousand is 13.91 compared with 14.03 for last year, which is reasonably creditable for cities of this class.

A substantial reduction of deaths from tuberculosis has been effected, although the number of new cases shows an increase. This increase, however, is attributed to the fact that better methods have been developed for following the cases.

There were 145 cases of typhoid in this city for 1915, with a death-rate of 18.3 per 100,000, an increase over last year, due mainly to an outbreak in August due to milk supply infection. According to the typhoid report of the American Medical Association, Hartford was in thirteenth place out of sixteen cities of this class, Cambridge leading with a low death-rate of 1.8 per 100,000. This seems to be Hartford's most serious problem.

Pneumonia was the largest single cause of death, demanding a total of 231 deaths. Heart disease and apoplexy were second and third respectively. Twenty-eight cases of syphilis and eighty cases of gonorrhea were reported anonymously in accordance with the state law, a result which can by no means be complete, though it represents a step in the right direction.

The infant death-rate was 107 per 1,000 births, a reduction of one since last year. The board of health is anxious to improve on this and laments the fact that their present birth law, which does not require the birth to be reported till the seventh day of the following month, renders very difficult any scheme of post natal nursing. It seems that the school inspection is limited to examination for communicable disease, and, while this is excellently done, the board wisely advocates extending this to health inspection, dental work and the follow up work of the school nurse in the homes of the children.

A novel idea incorporated in the section devoted to vital statistics is a table of occupations of those who died during the year. It is doubtful as to the benefit of such a tabulation without other correlating factors being noted too, but the departure is interesting. It is unfortunate that this report should lack an index for otherwise it is excellently prepared and complete.

Plainfield, New Jersey.

From Plainfield, of the small city class, one has come to expect a well-presented account of well-executed routine work plus progress from year to year, and the present report is no exception to the rule. The point of attack is now the control of infant mortality and of communicable disease through a desired public health nurse. A special point has for some years been made of milk and cream supplies, the character of which is set forth in clear tabulation of laboratory results. The supplies are of high bacteriological character and pasteurization is on the increase. Communicable diseases, especially tuberculosis, are discussed in adequate detail.

Under the head of diphtheria the value of the Schick test is recognized and it is stated that the procedure of culturing all contacts and isolating carriers has been adopted. In the tabulation of deaths it might be recommended that the specific titles, not merely the classes of the International Classification, be given. The report closes with a plea for a city planning commission, which would bring about a better correlation between the several city departments. The death-rate, 13.13, is calculated by the rather empirical method of excluding deaths of non-residents and adding to the result half as many to allow for the number of residents who died away from home.

Winchester, Massachusetts.

One of the early 1915 reports is that of Winchester, which records the low death-rate of 9.6 in its population of about 10,000 with absence of deaths from diarrheal disease as a salient feature. It does not, however, appear whether this record also applies to the communicable diseases of childhood. The board gives the curious statement that "while collecting swill is not a health measure, the failure to collect it properly is obviously a health question" as its reason for desiring to continue with this work instead of recommending its assumption, as with refuse collection, by the selectmen. The town prides itself upon its control of milk supplies, which it carries on with the assistance of the laboratory of the coöperative health organization of Wellesley and surrounding communities.

NOTES

Local Health Boards Must Prosecute Law Violators.—In the April *Public Health News*, issued by the New Jersey Department of Health, physicians, midwives, undertakers, clergymen and local health officers are warned that hereafter there shall be no discrimination in prosecution for the violation of health ordinances. In other words, should any member of the above professions fail to comply with the requirements of the law regarding the reporting of births, deaths and marriages, they shall be prosecuted.

Below is the resolution passed by the State Department of Health in this respect:

Resolved, That the Director of the State Department of Health with the aid of the Chief of the Bureau of Vital Statistics shall take prompt and vigorous measures to enforce the laws of the state relating to the reporting of births, marriages and deaths, and that in any and every case of failure of the responsible party to properly report a birth or marriage within five days and to exchange a certificate of death for a burial permit before burial, the said Director and Bureau Chief shall, as soon as that failure becomes known to them, mail a notice of such failure to the local board of health and to each member thereof in whose jurisdiction the violation occurs, accompanied by a warning that if said board does not order prosecution and submit to the State Department of Health proof of such prosecution of said delinquent person or an excuse for the delinquency acceptable to the Director of the State Department of Health, then the said State Department of Health will sue, in cases of failure to report births, under chapter 389, of the Laws of 1915, to recover penalty from each member of the local board except any member who may have voted to prosecute the violator of the law; for failure to report marriages, prosecutions will be ordered under chapter 199, Laws of 1912; and for failure to exchange a certificate of death for a burial or transit permit before burial takes place prosecution will be ordered under chapter 109, Laws of 1909.

*

State Health Train.—Below we quote the descriptions of the Florida Health Train, offered by the *New Smyrna* (Fla.) *News:*

"With the establishing of this 'health train' the State of Florida has taken a step in advance of other states in bringing directly to the people methods of disease prevention and teaching them how easy it is to preserve the health of any community.

"Car number one, the living car for the accommodation of the representatives of the State Board, contains the office in the observation end, four staterooms, bath and toilets, dining room and kitchen. Like the other cars of the train, it is heated with electricity generated by a dynamo in car number two, and like the others it is carefully screened and ventilated.

"Car number two contains in one end the dynamo, driven by a gasoline engine, and the sleeping quarters for the special train crew. The larger part of the car is devoted to the installation of various models, as that illustrating the Imhoff sewage disposal system, another showing how water in driven or open wells is contaminated by drainage from stable, outhouse and polluted surface water. A miniature model shows a dipping vat for ridding cattle of the tick. A model dairy is illustrated in the same manner; the proper feeding and clothing of babies and the open-air treatment of tuberculosis and many other practical questions of sanitation and disease prevention are similarly illustrated.

"This car is also fitted with a stereomotograph with a capacity of 104 lantern slides, and this is lighted and operated automatically by electricity generated in the car itself.

"Car number three is divided through most of its length by a partition, on which are displayed 36 panels. These carry in graphically worded sentences warnings and advice on sanitary subjects and disease prevention. Numerous electrically operated models and a large stereomotograph, similar to that in car number two, are also arranged to splendid advantage in this part of the train.

"In this car will be installed an expensive and elaborate contribution from the Florida Dental Society, which will show various diseases of the teeth, and the proper attention that should be given to them. In this car is gathered much of the equipment that has special significance in sanitation.

"A complete inventory of the educational equipment of these cars is unnecessary. The train with all its invaluable contents is to be brought within the reach of every person in Florida who can go to the nearest railroad station, and it will be taken wherever rails are laid on which it may run. It is to be permanent, a perpetual traveling school, illustrating forcefully and graphically how better health conditions, better sanitation and better living may be brought to every Floridian. When it has carried to every part of the state its object lessons, the journey will be repeated, with newer models and the later discoveries of medical science."

A HEALTH CREED

FOR MASSACHUSETTS BOYS AND GIRLS

MY BODY IS THE TEMPLE OF MY SOUL

Therefore:—

I will keep my body clean within and without;

I will breathe pure air and I will live in the sunlight;

I will do no act that might endanger the health of others;

I will try to learn and practice the rules of healthy living;

I will work and rest and play at the right time and in the right way, so that my mind will be strong and my body healthy and so that I will lead a useful life and be an honor to my parents, to my friends and to my country.

ISSUED BY THE MASSACHUSETTS STATE DEPARTMENT OF HEALTH

Diarrheal Diseases.—Dr. H. L. K. Shaw, Director of the Division of Child Hygiene of the State of New York, in the May issue of *Health News*, states that the number of diarrheal deaths in New York City under two years of age has steadily decreased from 6,360 in 1907 to 3,735 in 1915. Though the deaths from this cause in the rest of the state are in the aggregate much less in number, they have not shown the same proportional decrease.

To quote this bulletin on factors causing this decrease:

"The great predominance of deaths during the summer months amply justifies one's dread of summer diarrhea. Unfortunately, statistics are not available showing the number of babies fed on breast milk and those who are artificially fed, but in several places where such investigations have been made the ratio is about one to ten. Extremely hot weather, with a high humidity, lowers the resistance of the child and makes it more susceptible to infections through the alimentary tract. Investigations made by the New York Association for Improving the Condition of the Poor show very conclusively that the prevalence of flies had a marked influence on the number of cases of diarrheal disease. The very striking diminution of diarrheal deaths in New York City can be largely attributed to the improvement of the milk supply. It is fair to assume that the climatic conditions in New York City and the rest of the state were each year the same, and cannot be considered as a factor in comparing the two mortalities. All the milk in the City of New York, with the exception of certified milk, is pasteurized, and this precautionary measure has saved literally thousands of lives and prevented hundreds of thousands of cases of nonfatal diarrheal disease.

"*Very little effort has been made in the rest of the state until recently to improve the milk supply in the various towns and cities*, where the problem is far greater and more difficult of solution. The Public Health Council formulated the sanitary milk code which was put in operation in November, 1914. There has since been a decided improvement in the milk supply of a number of the larger cities, a number now using only pasteurized milk.

"The influence of this enlightened attitude with regard to the milk supply can be seen by comparing the number of deaths in 1914 with those of 1915, when there was a decrease of 140 deaths in New York State at large, and an increase of 308 deaths in the City of New York.

"The statistics of diarrheal deaths point very conclusively to the fact that these deaths can be prevented by *pasteurization and the general improvement of the milk supply*."

*

How to Feed the Family.—In response to inquiries as to the minimum cost of food for a family, the New York City Department of Health published in its weekly bulletin for May 13, the following list of articles of food sufficient for a family for one week on the assumption that the family consists of two adults and three children:

1 lb. butter	$0.42
1 bag sugar (3½ pounds)	.24
1 lb. rice	.08
1 lb. dried peas	.09
1 lb. beans	.09
1 lb. farina	.06
1 lb. oatmeal	.05
1 box cocoa (¼ pound)	.10
1 lb. prunes	.15
1 lb. onions	.04
6 lbs. potatoes	.22
1 head of cabbage (medium size)	.05
1 lb. cheese	.22
2 doz. eggs	.60
2 lbs. meat daily at 20 cents	2.80
2 loaves of bread daily at 8 cents	1.12
2 qts. of milk daily at 7 cents	98
Total	$7.31

This list of foods was originally devised and has had its practical application test for about two years by the Social Department of the Beth Israel Hospital, where the nutritional results have been excellent.

*

Typhoid Fever in Toronto.—In 1910 the death-rate from typhoid in Toronto per 100,000 population was 40.8. In 1915 it was 1.9, leading all cities of 350,000 population and over in America. This represents a saving of one hundred and ninety-five lives per year, which, assuming that only one case of every ten or fifteen die, means the prevention of over two thousand cases. The April monthly bulletin of the Toronto Department of Health devotes itself practi-

cally entirely to the discussion of its typhoid and the causes of the reduction of its rate.

The largest factor in the reduction of its rate is attributed to the chlorinating of its water supply, and its bacteriological examination six times a day. No milk typhoid has been in Toronto since 1912, due to the requirement for pasteurization of all milk entering the city (except certified milk). Nor has there been typhoid fever from oysters or raw vegetables. Contact infection has been discounted by circulars of information on typhoid and its spread and advocating inoculation. The danger of fly transmission has been considerably cut down by publicity campaigns against flies and by the abolition of outdoor privies.

In examining the results of the epidemiological examination of the 151 cases of typhoid in this city for 1915, one of the most striking features is that 69 of these cases were infected outside the city. This in words of the report supports the "contention now commonly being made that typhoid fever is becoming a rural disease and is growing less and less frequent in the cities."

Turning to the inside cases, of the eighty-two cases, thirteen, or more than 15 per cent., were found to be due to either direct or indirect contact. The bulletin suggests that though typhoid is not generally considered a so-called contagious disease, this number of cases of contact origin does not substantiate this theory, particularly in view of the fact that these contact cases were among those who nursed or were in the homes of those who were originally infected.

⚜

Humidity and Temperature.—The Chicago Board of Health through its publicity service warns the people of stagnant and overheated air. Desirous of improving indoor humidity, which in the average American home is far lower than it ought to be, the department has submitted a table upon the relative humidity that should be maintained for a given temperature. The temperature ranges from 60 to 72 degrees Fahrenheit, and the relative humidity to be maintained for the respective temperatures is believed to be productive of approximately ideal indoor conditions for both comfort and health.

Zone of Comfort Table.

At temperature 60° Fahrenheit relative humidity as indicated by the hygrometer reading should be 66 to 74.

At temperature 66° Fahrenheit relative humidity as indicated by the hygrometer reading should be 50 to 54.

At temperature 68° Fahrenheit relative humidity as indicated by the hygrometer reading should be 40 to 48.

At temperature 70° Fahrenheit relative humidity as indicated by the hygrometer reading should be 34 to 40.

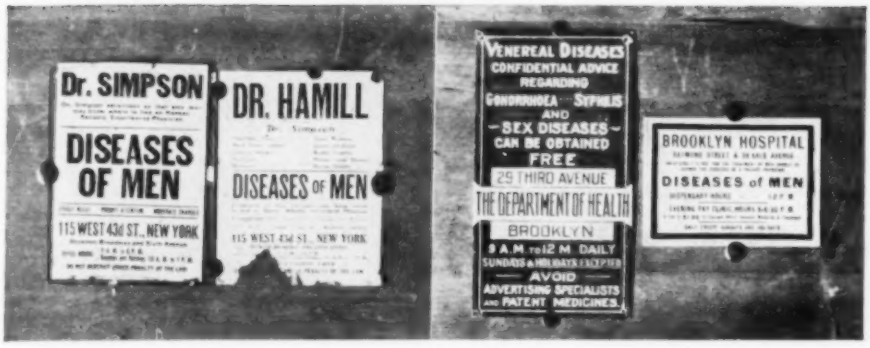
At temperature 72° Fahrenheit relative humidity as indicated by the hygrometer reading should be 30 to 34.

Of course, it is understood that along with a thermometer in the room there should be a hygrometer to give the humidity readings—in fact the hygrometer is fully as important an instrument to have in the home or workplace as is the thermometer. It is well understood that persons in normal health will be more comfortable in properly moistened atmosphere, temperature 66–68, than they will in a temperature of 70–72 with very low humidity.

⚜

A Good Sign.—Through the courtesy of the *Survey* we reproduce on the opposite page a photograph which well represents the trend of the modern movement to direct and protect those persons who unfortunately become afflicted with venereal disease. The notices on the right were posted in the washrooms of restaurants and barber shops to replace the signs of quack doctors shown on the left.

These photographs were taken by Dr. Alex Nicol Thomson and represent part of the excellent work being done by the pay-clinic of the Brooklyn Hospital and Dispensary, opened in August, 1915, commented on in the *Survey* of May 20 under the title of "Dispensaries of Today and Tomorrow."



TENTATIVE WEEKLY SCHEDULE FOR A PUBLIC HEALTH NURSE OF A DEPARTMENT OF HEALTH.

ONE NURSE ONLY BEING EMPLOYED

	8.30 to 9.30	9.30–11	11–12	12–1	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9
Monday	Office hour	Child welfare	Lunch	Communicable disease, including tuberculosis			Off duty				Health center hour, adults or children	
Tuesday	Office hour	Child welfare work			Lunch	Communicable disease, including tuberculosis		Off duty				
Wednesday morning off to 1 P. M.					Classes, clinics and instruction in child welfare subjects				Dinner	Health center hour, adults or children		
Thursday	Office hour	Child welfare activities			Lunch	Communicable disease, including tuberculosis		Off duty				
Friday	Office hour	Child welfare		Lunch	Classes, clinics and instruction in communicable disease, including tuberculosis			Off duty				
Saturday	Office hour	Child welfare	Communicable disease	Off duty to 7 o'clock							Health center hour	

—*May Bulletin, New York State Department of Health.*

Public Health Notes.

Mental Health of Children.—The California Society of Mental Hygiene, which is composed of physicians and social workers throughout the state, has prepared some suggestions for the protection of the mental health of children which are well worth remembering:

Give your child opportunity for a variety of wholesome activities and interests.

Train your child to work hard in some regular occupation suited to his ability and talents; but to avoid fatigue by alternation of work and rest.

Train your child to give attention to the present situation.

Train your child to strict obedience in a few important matters and let him alone in regard to the unimportant things.

Avoid conditions that tend to produce overstrain or precocity. The special business of a

young child is to grow and to play with other children.

Give your child a variety of well-cooked, wholesome food in ample quantity at regular intervals.

Train your child to healthful habits of sleep in fresh air, giving opportunity for at least nine hours, and for more than that before the age of twelve.

If your child becomes worried or sleepless, or has muscular twitchings or the like, consult a competent physician at once.

Take advice of a competent person concerning the peculiar, sensitive or nervous child, in order to correct a possibly bad inheritance by proper education and environment.

The best method of training is by example.

*

Politics and Health.—The May number of the *Journal of the Outdoor Life* has the following live editorial on this very important phase of public health administration:

"Anyone who has had experience in endeavoring to secure appropriations or legislative enactments from a city council will agree that in our American municipalities politics and health are very closely related. Probably it would be impracticable and possibly undesirable ever to divorce them completely, but judging from the experience of Chicago in its recent dealings with the Municipal Tuberculosis Sanitarium, it would certainly appear necessary to place the community's public health activities on a basis where spoils, politics and petty political manœuvering could not destroy the efficiency of the work.

"Politics pervades the police departments and fire departments of our cities, to be sure, but our American municipalities have come so to recognize the vital necessity for protection of property that, in spite of the ambitions and activities of political bosses, these departments can be kept up to a reasonable degree of efficiency. Where is the health department, however, that is on a par with the fire and police departments of the same city? One could count such upon the fingers of one hand and still have fingers to spare. Efficient public health administration, so far as adequate backing of the public purse and keeping free from political jobbery is concerned, is practically unknown in this country. It is high time that our American municipalities awoke to the fact that their health is worth more than their property and that in order to protect the public health two things are needed, first, adequate finances, and, secondly, administrative facilities which shall be grounded upon efficiency and not upon spoils and rewards to faithful political adherents. When the time shall come that these two qualifications are met in our public health administration there will be evidenced not only a rapid decrease in the death-rate of tuberculosis, but in the death-rate of all other communicable diseases as well. People of any city in America may buy protection from disease just exactly the same as they buy protection from fire, from flood and from criminals, provided they are willing to pay the price."

*

Diphtheria Control.—The fallacy of depending primarily on laboratory tests for the control of diphtheria is emphasized by D. M. Lewis, New Haven, Conn. (*Journal A. M. A.*, May 13, 1916). Carriers, he says, are of two types, pharyngeal and nasal. The former show acute hyperemia with chronic pharyngeal hypertrophy, and the culture result is positive. The second, or nasal, type shows a bloody purulent anterior nasal discharge, usually unilateral, with excoriation of the upper lip and neighboring skin. One class gives a history of a diphtheritic attack with epistaxis in its course or during convalescence, the characteristic discharge appearing a few weeks after the attack. In the other class the patient shows the lesion without having had the disease. In his first year's campaign he followed the prevalent practice of depending on the laboratory test at first. He found reason to regard inspection of the nose as less misleading than culture data. In the second year, therefore, he gave more prominence to field work and relied mainly on it. No contacts were isolated if the nasopharynx was normal, and the quarantine was raised. He had no reason to regret this course. The results were that following this method cases of diphtheria very markedly decreased in number. To secure still further control, recurring inspection by field nurses of children under school age in families with no school absentees is needed, together with the notification to the board of health of the arrival of new families in the community. "In the control of diph-

theria, the field work of the epidemiologist plays the most important rôle. The means by which he operates are the physical examination of patients and contacts, the subsequent careful supervision of the former at the time of head colds and sore throats, and the constant family and neighborhood survey for carriers."

"The Same Old Story."—The Toledo *City Journal* for May 6, 1916, contains a review of the health situation which should move our sympathy and yet has a touch of the humorous in it. Says the Commissioner dolefully:

"This is an obituary. This is the last word of the last gasp of a dying ambition.

"One month ago the Division of Health felt the stimulus of enthusiasm and opportunity. A sincere desire to do something for the community was the source of our enthusiasm. All of Toledo was our opportunity. The prevention of disease and death was to be our reward.

"We went before the Council and told them what we needed—money. They gave to us some, but it was not enough and it was all they could give.

"We went to the people. We asked them to support the bond issue. We felt that they would vote the money in order that the Division of Health might live, if for no other reason. They refused, and now we have no money. We must cease all work, except such as might pertain to the prevention of epidemics. We have been compelled to discharge our sanitary force and our welfare nurses. We have been compelled to curtail the service we should give to the sick poor. We have no funds with which to give hospital care to those who cannot buy it for themselves.

"We know that our appeal for help in homes of the unfortunate will ring to the heavens, but we cannot respond. We shall be criticised, and though our hearts will ache, we cannot do anything. In this great, rich city we languish for lack of sustenance; we starve for money. Where will it end? Is there no help? Where are the citizens who are back of the health movement in Toledo?"

The Negro Menace to the Public Health.—In the May issue of the *Southern Medical Journal* appears a remarkable article on the health phase of the "Negro Question." Figures indicate that in the south the death-rate is three to four times greater among the negro than among the white population. The extreme danger from infection through the employment of these people is obvious and Doctor Graves points out four lines along which the most progress can probably be made in the improvement of these conditions:

1. The enactment of proper housing laws, ordinances and regulations governing buildings, sewerage, drainage, water supply, ventilation and sanitation.

2. *Education for Both Whites and Blacks.*—(a) The inauguration of public health and preventive medicine courses in every medical college of importance throughout the country, so that an educated and trained body of sanitarians may be supplied to states and counties and cities for their health officers.

(b) The organization of efficient state, county and municipal health departments, with every modern laboratory equipment and with well trained, well paid and fulltime health officers in charge of same, not subject to political removal.

(c) The enlargement and encouragement of the educational efforts of the institutions of the colored people throughout the country, such as Tuskegee, Hampton, Wilberforce, Paul Quinn, Straight and Southern Universities, etc.

(d) The public schools, with the active assistance and direction of the school physicians and the teachers, may be made a most useful agent in the dissemination of health education.

(e) Collaboration with churches and social welfare workers everywhere in the newer movements looking to the welfare of the race.

3. *Certain social and legal restrictions* which have a political bearing, and which may become subjects of heated discussion, must be mentioned, although they may arouse divergent views among high-minded and well disposed individuals.

4. And finally, public clinics should be provided in all our municipalities large enough to bear the expense for medical, surgical and dental service to the poor and ignorant.

"Sanitary Homes Reduce Morbidity."—Plans have been completed for the erection of a series of model homes in the city of Washington for the purpose of demonstrating to the nation the

relationship between good housing and good health. These are to be known as the Ellen Wilson homes, and are not in the nature of an experiment, but are intended as a demonstration to the entire United States.

"The intimate connection between bad housing and bad health and good housing and good health is clearly recognized in Washington, where the alley dwellings have long been a matter of concern both to the health authorities and to public spirited citizens who wish the Capitol city to be an example to the nation. The alleys have been paved, sewers and water mains have been laid, they are lighted and cleaned as are the streets. Yet they keep their old lead over the streets when it comes to totalizing the figures for disease and death.

"In this, Washington's experience has been like that of Liverpool and other European cities, which tried unsuccessfully to make badly situated dwellings wholesome by cleaning and fumigating. After thirty-three years of unavailing effort to improve that which was fundamentally bad, Liverpool finally decided that the only hope lay in wiping out its insanitary areas. It demolished the old houses by the acre and in place of them built new houses. Where dwellings have been crowded so close together that there was scarcely passage room for a stout man to squeeze his way to one of the old rear houses, it built new dwellings opening upon wide spaces which provided light and air. Immediately sickness and death decreased —and with them vice and crime. What had seemed a hopeless struggle for more than a generation was won.

"Other cities in Europe have done the same and with the same results, but what makes Liverpool's figures of unusual value is that the new houses are occupied by the same people who occupied the old ones. In some cases the population on a given area in the new dwellings is 99 per cent., the same as that which lived on the area in the old buildings. So here the effect of housing is not complicated by questions of different occupants, of better food or clothing, or a generally higher standard of living. The housing only has been changed and the results are striking.

"Washington is attempting much the same work, though in a less dramatic manner. Congress has enacted a law which goes into effect on July 1, 1918, according to which all the alley dwellings in the District of Columbia must cease to be used for dwelling purposes. Meanwhile, in order that there may be accommodation for those who will be forced to seek new homes in street houses, there has been organized a limited dividend company which is to build houses that will be not only sanitary and provide an abundance of light and air, but houses attractive architecturally, homelike in their arrangements, and containing bathrooms and provision for hot water in place of the old outdoor closets and hydrants.

"Such houses as these cannot, of course, yield the return upon the investment that the old houses did. In fact, Congress, in its act incorporating the Ellen Wilson homes, limited its dividends to 5 per cent. net. But they will yield to their stockholders a dividend in the form of satisfaction because of a needed work well done. To their tenants they will give relief from preventable sickness and death and an increase in the joy of living."—*New York Medical Journal*, May 6, 1916.

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Finger Nail Deposits.—The significance of finger nail deposits in forensic medicine and in public and personal hygiene is pointed out by Albert Schneider, San Francisco (*Journal A. M. A.*, May 20, 1916), with the importance of their microscopic examination. This form of examination has been particularly applied to a number of criminal cases in this country and in Europe but has not been adopted as yet as an officially recognized routine. The possibilities of this examination became apparent to him over twenty-five years ago when incidentally examining the scrapings from his own finger nails and those of his laboratory assistants, the number and variety of substances found was astonishing. The method was first put in as a diversion in the laboratory work, but has since become a routine measure. The findings gave evidence of the routine labors engaged in for periods of from one to eight days previous, and of personal habits, kind and quality of clothing worn, business occupations, etc. The possible value of the method in detective work, in examination of spy suspects in war, suggested itself in making microscopic examinations of the nail deposits of persons who are traveling and who have been on journeys, or

special errands or missions. It was found that there is a very notable difference in the deposits of the nails of the right and left hand and also of the nails and fingers and thumbs of the same hand. The ordinary method of cleaning the hands, inclusive of the usual nail cleaning, does not materially alter the microscopic findings and even the vigorous use of the nail brush does not result in the removal of the deposits. Close trimming of the finger nails is far more effective, but this practice is rare. The bacteriologic findings are very interesting. The streptococcus apparently predominates in most cases, rather than the staphylococcus or the colon bacillus group, as one might reasonably expect. In 143 cases examined the order of predominance was as follows: "1. Streptococcus group, the acid fast varieties predominating. 2. Staphylococcus group. 3. *Bacillus coli* group, almost invariably present. 4. Bacilli, cocci and spirillæ probably derived from mouth, soil, food, water, body surface, nose, eyes, sewage, dust, dirt, etc. 5. Occasional yeast cells, spores and filaments of higher fungi. 6. Larvæ of vermes; occasional amebas; diatoms, algæ; etc." He gives instances of the value of such investigations and an outline of how they should be carried on. Thus far the medical profession has given but little attention to the part played by the finger nail deposits in infection. That there is danger in the hand shake is generally recognized, but it still holds its popularity. The finger nail deposits are the chief source of danger in the hand shake, and Schneider enumerates the principal methods of infection: 1. Autoinfections. Many skin diseases are traceable to scratching, particularly in persons with low opsonic indexes to the causative infections. 2. Heteroinfections, which can be transmitted this way and no lengthy argumentation is needed to prove that there is danger. Much valuable information can be obtained by such microscopic examinations.

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Sanitary Condition of Bottled Waters.—The Bureau of Chemistry for several years has been investigating the sanitary conditions in the production and distribution of bottled mineral and table waters, which are offered for sale in interstate commerce and therefore subject to the Food and Drugs Act. It is recognized that the sale of bottled waters is dependent largely upon the belief by the public in the purity of the product. The Bureau has recently conferred with a large number of sanitary experts and bacteriologists regarding a desirable standard for judging the sanitary character of bottled waters. As a result of the investigational work and the above mentioned conferences, the Bureau believes that the tolerances established by the Public Health Service of the Treasury Department for waters served on interstate carriers is none too rigid for application to bottled waters sold in interstate commerce or imported from foreign countries. The Treasury Department standards are as follows:

1. The total number of bacteria developing on standard agar plates, incubated 24 hours at 37°C., shall not exceed 100 per cubic centimeter; provided, that the estimate shall be made from not less than two plates, showing such numbers and distribution of colonies as to indicate that the estimate is reliable and accurate.

2. Not more than one out of five 10 cc. portions of any sample examined shall show (by the method of the Public Health Service) the presence of organisms of the bacillus coli group.

*

Life Tables of the Census Bureau.—The Bureau of the Census, Department of Commerce, is soon to issue a unique set of tables, the first of their kind which have ever been prepared by the United States Government. These tables, which were compiled under the supervision of Professor James W. Glover, of the University of Michigan, show death-rates and expectation of life at all ages for the population of the six New England states, New York, New Jersey, Indiana, Michigan, and the District of Columbia (the original death-registration states) on the basis of the population in 1910 and the mortality for the three years 1909, 1910, and 1911.

According to these tables the average expectation of life, at birth, for males is 49.9 years; for females, 53.2 years. The expectation of life at the age of 1 is considerably greater than at birth, being 56.8 years for native white males and 59.5 for native white females, and reaches its maximum at the age of 2, when it is 57.5 for the former class and 60.1 for the latter. At the age of 12 the average native white male's expectation of life is 50.2 years; at 25 it is 39.4

years; at 40, 28.3 years; at 50, 21.2 years; at 60, 14.6 years; at 70, 9.1 years; and at 80, 5.2 years. Similarly, at the age of 12 the average native white female's expectation of life is 52.6 years; at 25 it is 41.8 years; at 40, 30.3 years; at 50, 22.8 years; at 60, 15.8 years; at 70, 9.8 years; and at 80, 5.5 years. A part of the difference between expectation of life for men and for women is due to the greater number of violent deaths among men.

The enormous waste of infant life which still goes on, although medical science has done and is doing much to arrest it, is shown by the exceedingly high death-rates which prevail among infants under 1 year of age. Of 100,000 native white boy babies born alive, 4,975, or almost 5 per cent., die during the first month, and 12,602, or 12.6 per cent., die within one year. The girl baby's chance of life is considerably better, the death-rate among native white females during the first month being 3,894 per 100,000 born alive, or less than 4 per cent., and during the first year 10,460 per 100,000, or nearly 10.5 per cent.

The relative healthfulness of city and country is strikingly shown by the tables, according to which the death-rate among white males under 1 year of age in cities having 8,000 inhabitants and over is 13,380 per 100,000 born alive, whereas in smaller places the corresponding rate is 23 per cent. less than the rate for cities. A similar difference prevails with respect to white females under 1 year of age.

For white males the expectation of life, at birth, in rural localities is 7.7 years greater than in cities; and until the age of 39 is reached there is a margin of more than five years in favor of the country. Thereafter the difference becomes gradually less, until the age of 88 is reached, at and after which the cities show a slightly greater longevity than the rural localities. For white females the difference between urban and rural longevity, while pronounced, is somewhat less than in the case of males.

Industrial Hygiene and Sanitation.

Machinery and Accidents.—An impressive circular in the interest of decreasing factory accidents has been issued by the state industrial commission of New York. The state now has an accident compensation law similar to that in force in Massachusetts, but the law can avail little in the way of prevention until the factory management becomes thoroughly alive to its responsibility in the matter of safeguarding life. Competent factory inspection is a factor in this arousing, but such facts and figures as are here must have an educational influence among thinking men.

In the four years previous to the passage of the law a factory worker in the state was killed at his work through a machinery accident every two and three-quarters working days. A man was crippled every three and a half days, not including the nearly five a day who lost fingers or toes. The economic loss, moreoever, is a tremendous affair. In the single year of 1913, the 4,177 accidents connected with machinery that would have been compensable under the working of such a law as now exists would have entailed an economic loss, reckoned only on the basis of two thirds of the wage loss, of nine hundred thousand dollars.

The commission is emphatic in its warning and finds that three fourths of all accidents are connected with working machines, one eighth with conveying or hoisting machines, and one tenth with power transmitting machines. But of fatal accidents, which represent the extreme of seriousness, one half are connected with conveying and hoisting machinery, one fourth with power transmitting machinery, and one fourth with working machines. Or, comparing fatal with all accidents, it is found that among accidents connected with hoisting machinery, one in forty-five is fatal, power transmitting machinery, one in sixty-eight, and working machines, one in five hundred and seventy-eight.

✠

Social Insurance.—The Legislature of Massachusetts has passed a resolve creating a recess committee to investigate the question of social insurance. This question involves the taking of prevention measures by the state against ill health and death among the workers of the commonwealth and involves a study of sickness

in its relation to the increased cost of living by reducing the production power of labor.

In Germany, where the principles of social insurance were first given practical demonstration, certain benefits have resulted which seem to make it worth while to determine whether or not at least some modification of these principles may not be successfully tried out this side of the water.

The report of the Massachusetts Committee will be awaited with great interest.

*

Voluntary Increase in Wages.—Notice has been posted in the Willys-Overland automobile factory that wages of all employees will be increased voluntarily June 1. It will benefit seventeen thousand employees, and the company announcement says the annual payroll will be $14,300,000.

All employees receiving twenty-five cents or less an hour will be advanced 10 per cent.; between twenty-five and thirty cents, 7 per cent., and more than thirty cents, 4 per cent. In addition the number of weekly working hours is decreased from fifty to forty-eight, with pay for fifty hours.

*

"Safety First" at the Ford Plant.—The Ford Company has just put into circulation among the moving picture theatres of the country a new film called "Safety First." This film shows in actual operation all the mechanical safeguards that have been installed in the Ford Factory for "Safety First" and to protect the lives and limbs of the 29,000 Ford employees.

*

Safety in Industries.—As an outgrowth of the industrial casualty prevention conference held in Harrisburg in March, the governor has appointed a state safety board consisting of the heads of the state departments. They will organize and select a working committee of men under them who will formulate a practical plan that will be put into effect through the various branches of the state government. This will be to formulate regulations that will seek to guard against casualities of all kinds, and by promoting individual example do much toward bringing about the adoption of practical safety in industries throughout the commonwealth by making care automatic.

It is recognized that, owing to carelessness or inefficiency, or possibly to the absence of safety devices, there are annually in the state an overwhelming number of casualities, hundreds of them fatal and others that result in the maiming and permanent injury of thousands of men and women. It is contended that the majority of these mishaps could have been prevented had the individual involved exercised proper care or had the industry where he or she worked provided the necessary safety appliances.

According to information from the commissioner of the department of labor and industry, the report of the first two months of this year indicated that if the same ratio is kept up for the remaining ten months there will be mishaps to 300,000 workmen in the state, of which 2,500 will be fatal.

*

Benzol.—There has recently been reported, from an industry in which benzol is used, two deaths, supposed to be due to this substance. While it is believed that these deaths may have been due to certain toxic substances often present in impure benzol, the pure article is sufficiently dangerous to warrant a caution in its use. Benzol is a highly inflammable fluid obtained from the distillation of coal tar, and serves as the raw material for making phenol, picric acid and other substances in the arts, and also as a solvent for crude rubber. Besides being highly inflammable, its has marked toxic qualities and while usually its use does not give fatal results it may produce serious symptoms, or even result in death.

Acute benzol poisoning is caused by breathing benzol in the absence of adequate ventilation and is accompanied by symptoms of extreme prostration with a cyanosis due to the destruction of the red blood corpuscles.

Benzol should be used only where good conditions of ventilation prevail and its toxic properties should be fully recognized by those who use the substance in manufacturing processes or elsewhere.

*

Lead Paints in England.—The enactment of a law prohibiting the importation, sale or use of any paint material containing more than 5 per cent. of its dry weight of a soluble lead compound was recommended by the British Departmental Committee appointed to investigate the danger

of the use of paints containing lead to the health of persons engaged in painting buildings.

To give adequate time for paintmakers and others to arrange for supplies of nonpoisonous materials and also to facilitate the introduction of modifications in painting methods, where special work necessitates such changes, the committee recommends that the restriction of the amount of lead in paints to not more than 5 per cent. of soluble lead should not be enforced until three years after the publication of its report.

The appointment of a committee was prompted by the numerous cases of lead poisoning among painters, and the belief that many of them could be prevented by the same careful regulation or restriction which has proved effective in reducing the number of cases of lead poisoning in factories by more than one-half since 1900.

It is stated that about thirty deaths are reported each year in England and Wales from lead poisoning among house painters. The number of non-fatal cases is estimated at about seven hundred and fifty per annum.

The recommendations of the committee are signed by seven of its eight members, one a representative of the Association of Master Painters, submitting a minority report. This minority report vigorously challenges the conclusions and regulations of the other members of the committee and urges that regulation should at least be given a thorough trial before prohibiting the use of so valuable a paint material as white lead. This recommendation is based upon the claim that the center of danger in all industries is the dust produced, and that in painting the dust producing processes harmful to the health of the workers rest on the dry rubbing of the lead paint. Therefore, it is suggested that the rational course is to prohibit under heavy penalties the practice of dry rubbing down and thus remove the great source of danger from poisoning from lead dust.

⁂

The Forty-third Annual National Conference of Charities and Correction which convened this month in Indianapolis had the largest attendance in the history of the conference, more than 3,100 delegates being registered.

The conference gave a considerable amount of its time to the discussion of social insurance. The large proportion of poverty due to disease was emphasized by I. M. Rubinow in sketching a plan for health insurance. Doctor Rubinow pointed out that at present the rich can afford to provide specialists and the poor are treated in dispensaries and free clinics, but the mass of American wage-earners are unable to pay for the one and do not wish to take advantage of the other. Doctor Rubinow pointed out the effect health insurance would have in improving the quality of medical service rendered the community.

⁂

The Common Drinking Cup and Towel in Massachusetts.—At a meeting of the Massachusetts State Department of Health held on March 22, the common use of drinking cups and towels in factories was unlawful.

The term "common drinking cup" is construed to mean any vessel or utensil used for conveying water to the mouth and available for common use by the public. By "common towel" is meant a roller towel or a towel available for use by more than one person without being washed after such use.

⁂

Health of Munition Workers.—The health of munition workers committee, which was appointed in September, 1915, "to consider and advise on questions of industrial fatigue, hours of labor, and other matters affecting the physical health and physical efficiency of workers in munition factories and workshops," in November and December, 1915, submitted three interim reports on special phases of their work, including Sunday labor, welfare supervision, and industrial canteens. Evidence was taken in London and other important centers from employers, representatives of workers, and other interested persons, and a large number of factories and workshops situated in different parts of the country was visited by one or more members of the committee.

In its study of welfare supervision among munition workers, the committee found that "almost more important than the immediate or technical environment in which work is carried on and the length of hours during which the workers are employed," are four chief influences which affect industrial efficiency, namely, questions of housing, transit, canteen provision, and individual welfare of the employees.

Based upon the proposition that productive

output in regard to quality, amount, and speed is largely dependent upon the physical efficiency and health of the workers, which in turn is dependent upon nutrition, and that a dietary containing a sufficient proportion and quantity of nutritive material, suitably mixed, easily digestible, and obtainable at a reasonable cost is essential, the committee expresses the conviction that "in the highest interest of both employer and worker, proper facilities for adequate feeding arrangements should be available in or near, and should form an integral part of, the equipment of all modern factories and workshops." Many employers, it is pointed out, have established industrial canteens, and this practice "has abundantly justified itself from a business and commercial point of view," and in the opinion of the committee "the time has come for a large extension of this method of solving the problem" of supplying suitable food at a low price for a large number of persons for specified times. Speaking generally, the accommodation provided accords with one or other of the following types:

An available room for the workers to eat their prepared food;

(2) A room furnished with a "hot plate" or "warming cupboard" or provided with hot water;

(3) A refreshment barrow to perambulate the workshops at appointed hours (particularly useful for light refreshments during long spells of night shifts);

(4) A fixed refreshment bar or buffet;

(5) A dining room supplying hot and cold dinners;

(6) And such dining room associated with an institute or club with facilities for rest and recreation.

In order to insure effective results of the establishment of industrial canteens, certain essential conditions are suggested and outlined, including accessibility and attractiveness, form, construction, and equipment, food and dietaries with suggested prices, prompt service, convenient hours, methods of payment for meals, and management.

The report indicates that substantial advantages, both to employers and employees, have followed the establishment of effective and well managed canteens. Marked improvement in the health and physical condition of workers, a reduction of sickness, less absence and broken time, less tendency to alcoholism, an increased efficiency and output, a saving of time of the workmen, greater contentment, and better midday ventilation of the workshops are some of the benefits noted.

✠

Dusty Occupations.—V. C. Baker, New York (*Journal A. M. A.*, May 6, 1916), has investigated the influence of dusty occupations in the production of disease among the patients examined at the Cornell University College dispensary. The diseases investigated were those observed in furriers, of whom there were sixty-nine applying for treatment, mostly natives of Russia and Austria Hungary. There were few hatters and they are not considered in the statistics, though they are liable to injury from dust and from the use of mercuric nitrate. Most of the workers were young adults, only twelve being over 40 years old. The respiratory tract is most frequently involved. There were nine patients with pulmonary tuberculosis, twelve with chronic bronchitis, ten with emphysema, and two with bronchial asthma. Of the latter two, one attributed his trouble to the anilin dyes used. The occupation of barber is not usually considered a dusty one, and but 110 were examined. There were forty-five patients with respiratory disease and thirty-one with alimentary tract disorders. The dust cannot be blamed for this, but the occupation causes fatigue from long standing on the feet and thus affects normal alimentary processes. One hundred and thirty bakers were examined. The occupation has long been considered insanitary, but has been much improved by regulation. The chief hazards are exposure to excessive heat and flour dust. Fifty-four showed signs of respiratory disease, and thirty-one patients alimentary diseases. Seventeen had gastric disturbances, probably due to overindulgence in their own wares, and there was also present the more or less constant use of alcohol. In the manufacture of tobacco, cigars and cigarettes a certain amount of dust is produced—plenty in the work of the strippers and tobacco handlers. In the manufacture of cigars there are few moist leaves used, and the atmosphere contains fine particles of tobacco with its nicotin and volatile oil and other extraneous matters. Ninety-two of the workers examined were cigar makers, nineteen cigarette-

makers, and fourteen tobacco handlers. There were thirty-eight patients with respiratory diseases, thirty with alimentary complaints, chiefly chronic gastritis and constipation, and twenty-five with nervous diseases, including headaches and neurasthenia. There was one patient with acute nicotin poisoning and one with tachycardia. Nineteen marble workers were examined, eight suffering from respiratory diseases. Most of the stone cutting is done outdoors in large airy sheds, and pneumatic tools are used to a considerable extent nowadays. These tools stir up much dust, which is increased by the use of air pressure to keep the cutting surface clear. Thirty-seven cases were encountered, in twelve of which the patients suffered from respiratory diseases. Although only one case of chalicosis was recorded, a greater number would probably have been noted if other factors were studied as closely as physical signs. Thirty-six plasterers were examined, and the respiratory tracts were found largely involved. Admitting dust to be the important causative factor, Baker recommends the following methods of meeting it: In the fur trade one of the worst processes is beating. This should be done in a separate room with proper means of removing the dust from the atmosphere. It should not be allowed to accumulate. Sweeping should be done after hours with vacuum cleaner or dampened floors. Respirators should be worn wherever dust is prevalent. Among the barbers, hairs should not be allowed to remain on the floors, and ventilating fans and currents should be directed so as not to disturb them. Special care should be observed in bakeries against raising dust, and where there is dust, proper protectors to the nose and mouth should be used. The tobacco workers should not allow scrap to accumulate, and the already mentioned methods of ventilating and sweeping should be employed. In marble work, stone cutting and plastering, the fine material should be removed as soon as possible, and procedures involving dust production should be curtailed as much as possible. Respirators are called for where dust is unavoidable. Other general cautions in the dusty trades are instruction of the workers as to the risk, frequent physical examinations, fresh air and cleanliness in the home and the encouragement of exercise. The workroom should not be overcrowded or littered, and light and ventilation should be properly provided for. The high percentage of respiratory diseases in certain trades is due to the exposure to dust which prepares the lungs to receive infection.

Personal Notes

At the annual meeting of the National Conference of Charities and Corrections held in Indianapolis, May 6–19, Mr. F. A. Almy, secretary of the Charity Organization Society of Buffalo, was elected president for the coming year.

⚜

Dr. W. S. Rankin was elected vice-president of the National Tuberculosis Association at its annual meeting held in Washington, D. C., May 9–12.

⚜

At the thirty-first annual meeting of the Conference of State and Provincial Boards of Health held in Washington, D. C., on May 16, Dr. T. D. Tuttle, Commissioner of Health of the State of Washington, was elected president; Dr. Samuel L. Jepson, commissioner of health of the State of West Virginia, was elected vice-president; and Dr. Eugene R. Kelly, Chief of the Division of Communicable Disease of the Massachusetts Department of Health, was elected secretary.

⚜

Dr. William C. Woodward, Commissioner of Health of Washington, D. C., at the annual meeting of the Medical Jurisprudence Association held at Washington, D. C., on May 6, was elected councilor for the term ending 1921.

⚜

Dr. Lewis Fish has resigned as district state health officer of the Massachusetts State Health Department.

⚜

Dr. Thomas Tetrau, formerly health officer of North Yakima, Wash., has been appointed health officer of Portland, Maine.

Dr. Burdett L. Arms, formerly Professor of Preventive Medicine, at the University of Texas, has been appointed Director of the bacteriological laboratory of the Alabama State Board of Health at Montgomery.

⁂

Mr. J. L. Tobey has been elected assistant health officer of Summit, N. J.

⁂

Mr. R. N. Hoyt has been appointed health officer of Manchester, N. H., and Mr. Henry Berger has been appointed to succeed him as director of the Coöperating Boards of Health at Wellesley, Mass.

⁂

Mr. Carl E. Buck has been appointed commissioner of health of Oak Park, Ill.

⁂

Dr. John R. McDill of Milwaukee has been selected as surgeon in chief of two field hospitals of 500 beds each, to be established in Germany and Austria by the American Surgeons' Expeditionary Committee.

⁂

The following persons were elected to membership in the American Public Health Association:

Austin U. Simpson, M. D., Seattle, Wash., City Bacteriologist.

A. C. Bachmeyer, M. D., Cincinnati, Ohio, Superintendent Cincinnati General Hospital.

Harlow O. Caswell, Ft. Atkinson, Wis., Physician and Surgeon.

Helen M. Scheller, Little Rapids, Wis., Supt. Brown County Sanatorium.

Royal Knight Joslin, Providence, R. I., Medical Student, Tufts.

Mildred H. Lucia, R. N., Eau Claire, Wis., Supt. Mt. Washington, Eau Claire County Tubercular Sanatorium.

John Rich McDill, M. D., Milwaukee, Wis., Surgeon.

John C. App, Charleston, W. Va., City Chemist and Bacteriologist.

Walter A. Reilly, Naugatuck, Conn., Physician and Local Health Officer.

R. W. Showalter, Indianapolis, Ind., Director, Biological Dept., Eli Lilly Co.

Charles C. Benedict, M. D., Anchorage, Alaska, Physician.

Albert A. Pastene, M. D., Chester, Mont., Physician and Health Officer.

Alec Nicol Thomson, M. D., New York City, Brooklyn Hospital.

Current Public Health Literature.

AMERICAN.

Albany Medical Annals.

XXXVII. May.

Report of the Health Director of the Albany Public Schools. Clinton P. McCord.

American Journal of Clinical Medicine, Chicago.

MCMXVI. May.

Recreations for the Aged. I. L. Nascher.

American Journal of Sociology, Chicago.

XXI. May.

Fifty Years of Sociology in the United States, 1865-1915. Abbion W. Small.

American Medicine.

XXII. April.

Some Important Events in the Development of Medicine in America. R. I. Geare.

American Journal of Tropical Diseases and Preventive Medicine, New Orleans.

III. May.

One Hundred Cases of Malaria Treated by Intravenous Mercuric Chloride, and the Possibility of Its Use in a General Anti-Malarial Campaign. Part II. Nathan Barlow.

The Mosquitoes of Mecklenburg County, N. C. H. P Barret.

Mycetoma in Western Panama. W. T. Burres.

Intestinal Bilharziosis in Western Panama. W. T. Burres.

Boston Medical and Surgical Journal.

CLXXIV. May 11.

The Fallacies of Group Treatment. H. J. Cronin.

May 18.

How the State Provides for Its Mentally Ill. L. Vernon Briggs.

June 1.

Five Years' Progress in the Diagnosis and Treatment of Consumption by Massachusetts Physicians. John B. Hawes, 2d.

B. Dysenteriæ as a Cause of Infectious Diarrhea in Infants. Carl Ten Broeck, F. G. Norbury.

Canadian Public Health Journal, Toronto.

VII. May.

Social Service and Hospital Efficiency. H. R. Y. Reid.

The Feeble-Minded and the Public Schools. Chas. G. Frazer.

Journal of the American Medical Association, Chicago.

LXVI. April 29.

The Value of Health Examinations. H. J. Cronin.

The Laboratory Examination of Material in a Case of Suspected Smallpox. J. N. Force.

A Simple Method of Quantitive Determination of Complement Fixation. I. O. Herschfelder.

May 6.

Syphilis and Life Insurance, with Special Reference to the Wassermann and Luetin Reactions. J. A. Kolmer.
Industrial Anilin Poisoning in the United States. R. V. Luce.
An Outbreak of Typhoid Attributed to Infected Oysters. P. B. Brooks.
Further Observations on the Schick Test for Diphtheria Immunity. G. H. Weaver.
Dusty Occupations. Valentine C. Baker.

May 13.

Control of Diphtheria. D. M. Lewis.

May 20.

Vaccine Treatment. Ludvig Hektoen.
Streptothrix in Broncho-pneumonia of Rats Similar to that in Rat-Bite Fever: A Preliminary Report. Ruth Tunnicliff.
The Bacillus Epilepticus. Third Report. C. A. Reid.
The Microscopic Examination of Finger Nail Deposits; Significance in Forensic Medicine and in Public and Personal Hygiene. Albert Schneider.
The Pseudoreaction of the Schick Test. A Zingher.

May 27.

A Study of 1,153 Cases of Scarlet Fever, with Special Reference to Their Sequelæ. Louis I. Dublin.
The Municipal Hospital as a Factor in Clinical Teaching. H. W. Loeb.
The Duration of the Nursing Period in Women of the United States. A. G. Mitchell.
The Etiology of Typhus Fever in Mexico. P. K. Olitsky, B. S. Dinzer, C. E. Husk.
Notes on Grip Epidemic in Chicago. A. M. Moody, J. A. Clapp.

Journal of the American Water Works Association, Baltimore.

III, No. 2. June.

The Typhoid Toll. George A. Johnson.
The Latest Method of Sewage Treatment. Edward Bartow.
The Water Supplies of Interstate Common Carriers on the Great Lakes. H. P. Letton.
The Bubbly Creek Water Softening Plant. C. A. Jennings.
Pressure Filters. Harold C. Stevens.
Further Development of Iron Removal Plant and Storage. F. C. Amsbary.
Erosion of Watersheds and Its Prevention. Benjamin Brooks.
Water Softening by Filtration through Artificial Zeolite. D. D. Jackson.
Difficulties in the Designing and Operation of Medium Sized Water Works Plants. E. B. Black.
Some Aspects of Chlorination. Joseph Race.
Tropical Water Supplies with Special Reference to the Canal Zone and to Vera Cruz, Mexico. James T. B. Bowles.

Journal of Bacteriology, Baltimore.

I. March.

Preliminary Report on Synthetic Media. C. J. T. Doryland.
The Significance of the Voges-Proskauer Reaction. Max Levine.
Are Spore-forming Bacteria of Any Significance in Soil under Normal Conditions. H. J. Conn.
A Possible Function of Actinomycetes in Soil. H. J. Conn.
A Species of Alcohol-Forming Bacteria Isolated from the Interior of Stalks of Sugar Cane Infested with the Cane-borer Diatræa Saccharalis. W. L. Owen.

Journal of Experimental Medicine, Baltimore.

XXIII. June 1.

Experiments on the Development of Malarial Parasites in Three American Species of Anopheles. W. V. King.
Bacteriological and Experimental Studies on Gastric Ulcer. H. C. Celler, Wm. Thalhimer.

Journal of Infectious Diseases, Chicago.

The Bacteria of Milk Freshly Drawn from Normal Udders. Alice C. Evans.
The Etiology and Experimental Production of Herpes Zoster. E. C. Rosenow, Sverre Aftedal.
The Epidemiology of Pellagra in Nashville, Tenn.

Journal of Laboratory and Clinical Medicine, St. Louis.

I, No. 8. May.

Specific Parenteral Digestion and Its Relation to the Phenomena of Immunity and Anaphylaxis. J. Bronfenbrenner.
The Serotoxin of Jobling. N. R. Smith.
Newer Laboratory Methods for the Early Diagnosis of Pulmonary Tuberculosis. Morris H. Kahn.

Journal of the Outdoor Life, New York.

XIII. June.

The Diagnostic Function of the Tuberculosis Dispensary. F. Elisabeth Crowell.
The Dispensary as a Bureau for the Admission of Tuberculosis Patients to Hospitals and Sanatoria. Karl Schaffle.
Tuberculosis Dispensaries in Massachusetts. Eugene R. Kelly.

Medical Times, New York.

XLIV. June.

The Pharmacology of Alcohol. H. W. Wiley.
Factory Legislation—Its Medical Aspect. Abram I. Elkus.
The Pathology of Syphilis. F. E. Gardner.
The Dietetics of Efficiency after 40. Louis Faugeres.

Modern Hospital, St. Louis.

VI. June.

Heating Systems for Hospitals of Various Sizes. Frank Sutton.
Municipal Receiving Hospital for Detroit, Mich. John Scott.
The Small Community Hospital—Its Creation. J. A. Hornsby.
Compulsory State-Wide Health Insurance and Its Relation to the Medical Service. E. R. Hayhurst.
Vast Welfare Activities Under Way. L. A. Coolidge.
The Convalescent Field—Its New and Changing Border Lines. Frederick Brush.

New York Medical Journal.

CIII. April 29.

Teacher's Vitality as Indicated by the Ptosis Test. I. H. Goldberger.

May 13.

The Immune Response in Pulmonary Tuberculosis. Ellis Bonime.

May 20.

Specific Therapy in Certain Acute Infectious Diseases. F. J. Dever.
Concealed Measles. Ralph Opdyke.

New York State Journal of Medicine.

16. May.

Will the Private Practitioner Determine the Future of Public Health Work. Haven Emerson.
The Treatment of General Infections by Sera and Vaccines. A. MacFarlane.
Syphilis as an Etiological Factor in Epilepsy. W. T. Shanahan.

Nurse, The, Jamestown, N. Y.

IV. June.

The Psychology of Nursing. James F. Rogers.
The Nurse and the Mental Patient: II. Anne E. Perkins.
The Rôle of the Visiting Nurse: VI. The Industrial Nurse. Stella Fuller.

Southern Medical Journal, Birmingham.

IX. May.

The Negro a Menace to the Health of the White Race. Marvin L. Graves.
A Plea for a National Committee on the Eradication of Malaria. F. J. Hoffman.

The Trained Nurse, New York.

LVI. June.

Relaxation vs. Christian Science. Annette Fiske.
Practical Points in Mental Nursing for the General Nurse. Harry W. Keatley.
The Protective Treatment against Typhoid Fever. Stephen Paget.

United States Public Health Reports.

XXXI. April 28.

Some Fallacies Regarding Phenol. Martin I. Wilbert.

May 5.

Smallpox in Germany (Abstracted from Medizinal-Statistische Mitteilungen aus dem Kaiserlichen Gesundheitsamte).

May 12.

Tertian Malarial Fever. M. Bruin Mitzmain.

May 19.

The Control of Mosquitoes.
Pellagra. J. R. Ridlon.

May 26.

The Division of Domestic Quarantine. W. C. Rucker.
Health of Garment Workers. The Relation of Economic Status to Health. B. S. Warren, Edgar Sydenstricker.

FOREIGN.

BRITISH EMPIRE.

British Journal of Tuberculosis, London.

X. April.

Crippled Tuberculous Children. H. J. Gauvain.
Infection in Tuberculosis. T. Shennan.
Examination of Contacts at Tuberculosis Dispensary. N. Robertson.
Bedroom of Consumptive.

British Medical Journal, London.

No. 2887. April 29.

Method of Preparation of Nontoxic Dysentery Vaccine. H. R. Dean, R. S. Adamson.
New Apparatus for Bacterial Fermentation Tests; Fermentation Bulbs. S. Delepine.

Journal of State Medicine, London.

XXIV. May.

The Sexual Disease Campaign.
Royal Commission on Venereal Diseases, 1916.
Powers and Duties of Local Authorities with Regard to the Housing Question. Sir Thomas Hunter.
Sanitary Progress in British Guiana. K. S. Wise, E. P. Minett.

Lancet, London.

No. 4831. April 1.

Investigation of Strains of Tubercle Bacilli Derived from Sputum. A. S. Griffith.
Food Economies in Relation to the War. H. Campbell.

April 8.

Use of Stock Vaccine for Infection of Bacillus Typhosus. T. H. Whittington.
Agglutination Tests in Inoculated Persons, and Influence of Fibrile Condition on Inoculation Agglutinins. Dreyer, Gibson and Walker.
New Apparatus for Isolation and Cultivation of Anaërobic Microörganisms. J. McIntosh and P. Fildes.

April 15.

Acute Poliomyelitis. F. E. Batten.
Standard Method for Testing Antiseptics for Wounds, with Some Results. W. d'E. Emery.

April 22.

Infantile Mortality and Relative Practical Value of Measures Directed to Its Prevention. S. G. Moore.
Preparation and Use of Certain Agglutinating Serums. H. Chick.

Medical Officer, London.

XV. April 22.

Health and Housing. A. K. Chalmers.

April 29.

Typhoid Fever in London.
Health and Housing. A. K. Chalmers.

May 6.

Health and Housing. Concluded. A. K. Chalmers.

May 13.

Sale of Milk Regulations.
Administration of the Sale of Food and Drugs Acts, as Affecting Milk Supplies. John A. Goold.

May 20.

Housing Conditions in the Northern Mining Districts.

Public Health, London.

XXIX. May.

A Discussion on Maternity and Child Welfare. H. Renney.
Tuberculosis and Cotton Operatives—Some Problems. A. M. Hewat.
Cerebro-Spinal Fever: An Analysis of the St. Pancreas Cases in the Epidemic of 1915. T. S. Higgins.
On the Application of Vaccines to the Treatment of Diphtheria. J. P. Johnson.
Discussion on Measles Regulations.

FRANCE.

Paris Medical.

VI. March 25.

Diagnosis and Prognosis of Paratyphoid Infection. L. Rimbaud.
Necessity for Special Services for Digestive, Infectious and Respiratory Affections. G. Rosenthal.

April 8.

The Mirror as Aid in Obtaining Sputum for Examination. G. Rosenthal.

April 15.

Piping Drinking Water in the Trenches. Lemoine and Duplessis.
Rat-Bite Fever. J. Fievez.

April 22.

Malaria in Flanders. F. Rathery and R. Michel.

Bulletin de l'Académie de Medécine, Paris.

LXXV. March 28.

The Birth-Rate in France and Its Colonies. A. Pinard.
Venereal Diseases During the War at Military Hospitals in Paris. Gaucher.
Dispensary Treatment of Syphilis. Jeanselme and Hudelo.

April 4.

Prophylaxis of Scarlet Fever by Milne's Method. Lemoine and Devin.
Amebic Dysentery in France. Orticoni and Ameuille.

April 18.

Appeal for Suppression of Garbage Picking Inside City Limits. Wurtz.

The Prevalence of Syphilis not Recognized before the War. L. Landouzy.

Rational Treatment of Syphilis under Guidance of Wassermann Test. E. Jeanselme.

GERMANY.

Berliner Kleinische Wochenschrift.

LIII. April 27.

Prophylaxis of Tetanus. Kümmell.

Deutsche medizinische Wochenschrift, Berlin.

XLII. April 13.

Parasite Found in the Louse as Possible Typhus Germ. W. Stemfell.

Diagnosis and Epidemiology of Dysentery. F. Schütz.

Tuberculin Does not Mobilize the Tubercle Bacilli. Möllers and Oehler.

Improved Counting Chamber. E. Liebreich.

Monatschrift für Kinderheilkunde, Berlin.

XIII. No. 9.

The Schick Test for Immunity to Diphtheria. Vessau and Schwenke.

No. 11.

Epidemiologie Study of Measles. H. Wagner.

Münchener medizinische Wochenschrift, Munich.

LXIII. March 28.

Local Treatment of External Tuberculosis. A Strauss.

Amyloid Degeneration Seems to be Work of Bacillus of Friedländer Group. A. Frank.

Yeast as Food. H. Wintz.

Official Directions for Prophylaxis of Tuberculosis. M. Henkel.

April 18.

Streptococcus plus Diphtheria Bacillus Meningitis. F. Reiche.

Official Prophylaxis of Typhoid Fever. M. Henkel.

Bile Agar for Cultivation of Typhoid Bacilli. L. Löhner.

BOOKS RECEIVED.

Tobacco Habit Easily Conquered. By Max MacLevy. Albro Society, Inc., New York City. 1916. Pp. 154. Price, $1.25, net.

Second Pan American Scientific Congress, Final Act. Prepared by James Brown Scott, LL. D. 1916. Government Printing Office, Washington, D. C.

The Mortality of Cancer throughout the World. By Frederick L. Hoffman, LL. D. The Prudential Press, Newark, N. J. 1916. Pp. 800. Charts and tables.

Transactions of the Sixth Annual Meeting of the American Association for Study and Prevention of Infant Mortality. Executive Secretary, Miss Gertrude Knipp, 1211 Cathedral Street, Baltimore, Md. 1916. Pp. 467.

Campaign for Clean Milk. A Series of Articles That Have Appeared in the *Observer*. Published by the Saint Catherine Press, London, for the National Clean Milk Society, Inc. 1916. Pp. 51. Price, one shilling, net.

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AMERICAN PUBLIC HEALTH ASSOCIATION

REVISED

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JUNE FIRST

1916

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June 1, 1916.

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MEMBERS.

Abercrombie, T. F.	710 Union St., Brunswick, Ga.	1914
Aberthnay, Wm. Green, M. D.	Woodland, Miss.	1914
Adams, George E.	676 Jefferson St., Milwaukee, Wis.	1914
Adams, F., M. D.	497 Brunswick Ave., Toronto, Ont.	1915
Adams, George O.	Experiment Station, Lawrence, Mass.	1914
Adams, Samuel Hopkins	Ensenore, N. Y.	1915
Agramonte, Aristides, M. D.	K St., 146-148 Vedado, Havana, Cuba	1915
*†Albert, Henry, M. D.	221 South Lucas St., Iowa City, Iowa	1907
*Alden, A. M.	Santa Tomas Hospital, Ancon, C. Z.	1913
Alexander, Morris J., Sr., M. D.	Tunica, Miss.	1916
‡Allen, A. F.	Asst. Health Officer, Tuscaloosa, Ala.	1913
‡Allen, Kenneth	Municipal Bldg., New York City	1915
||Allen, L. C., M. D.	Hoschton, Ga.	1914
Almy, Frederick	181 Franklin St., Buffalo, N. Y.	1915
*Alsberg, Carl L.	Bureau of Chemistry, Washington, D. C.	1913
‡Alvord, John W.	127 Hartford Bldg., Chicago, Ill.	1899
Amer. Tel. & Tel. Co.	15 Dey St., New York City	1915
Amerman, Miss Bessie Ely	265 Henry St., New York City	1916
*Amos, Harold L.	Rockefeller Institute, New York City	1911
*‡Amyot, John A., M. D.	4 Laburmen Ave., Toronto, Ont.	1900
Anderson, John B., M. D.	Health Officer, Spokane, Wash.	1912
*Anderson, John F., M. D.	Care E. R. Squibb & Sons, New Brunswick, N. J.	1903
*Andrews, C. J., M. D.	511 Taylor Bldg., Norfolk, Va.	1912
**Andrews, John B.	131 East 23d St., New York City	1913
App, John C.	1008 Quarrier St., Charleston, W. Va.	1916
Archibald, Robert A., M. D.	1724 Webster St., Oakland, Cal.	1910
Arkin, Aaron	519 Front St., Morgantown, W. Va.	1914
Armagnac, Arthur S.	1123 Broadway, New York City	1915
Arment, Samuel B., M. D.	25 West 5th St., Bloomsburg, Pa.	1901
*†Arms, B. L., M.D., Bacteriological Laboratory, State Board of Health, Montgomery, Ala.		1906
§||Armstrong, D. B., M. D.	39 Pearl St., Stapleton, N. Y.	1913

ARNOLD, FRANK	408 House Bldg., Pittsburgh, Pa.	1913
†ASCANIO, RAMON, M. D.	San Jose Delas Lajas, Havana, Cuba	1911
*‡ASHFORD, BAILEY K. (Maj.), M. D.	San Juan, P. R.	1912
ASHLEY, BURTON J.	11112 South Hoyne Ave., Chicago, Ill.	1915
ATWELL, FLOYD J., M. D.	48 Chestnut St., Cooperstown, N. Y.	1915
ATWOOD, FRANK GARWOOD	158 Whalley Ave., New Haven, Conn.	1914
AYER, IRA, M. D.	Bangkok, Siam	1915
AYRES, J. M.	City Health Officer, Bennington, Vt.	1914
*AYRES, S. HENRY	Dairy Division, U. S. Dept. Agriculture, Washington, D. C.	1912
‡BACHARACH, E. W.	429–31 Rialto Bldg., Kansas City, Mo.	1914
BACHMANN, FRANK	102 Civil Engineering Bldg., Berkeley, Cal.	1915
BACHMEYER, A. C., M. D.	Cincinnati General Hospital, Cincinnati, Ohio	1916
*BAILEY, EDGAR H. S., M. D.	1101 Ohio St., Lawrence, Kan.	1910
BAILEY, WILLIAM J.	802 Twiggs St., Tampa, Fla.	1915
BAILEY, WM. S.	110 East 4th St., Jamestown, N. Y.	1915
BAKEMAN, G. W.	1022 Chestnut St., Newton Upper Falls, Mass.	1914
††BAKER, CLARENCE M.	189 Kent St., Albany, N. Y.	1914
BAKER, JOHN	539 Main St., Stamford, Conn.	1915
††BAKER, M. N.	53 Oakwood Ave., Upper Montclair, N. J.	1912
BAKER, S. JOSEPHINE, M. D.	139 Centre St., New York City	1915
*BALCH, ALFRED W., M. D.	416 Huntington Ave., Boston, Mass.	1914
*‡BALDWIN, F. O.	706 Chamberlayne Ave., Richmond, Va.	1912
*BALDWIN, FREDERICK A.	Metropolitan Bldg., St. Louis, Mo.	1914
*BALDWIN, HERBERT B.	927 Broad St., Newark, N. J.	1905
§BALDWIN, W. H.	1415 Twenty-first St., Washington, D. C.	1914
†BALL, C. B.	4227 North Ashland Ave., Chicago, Ill.	1910
BALL, H. J., M. D.	Cortland, N. Y.	1915
BALLINGER, T. DUDLEY	294 Park Ave., Orange, N. J.	1913
BANTRELL, M.A., C. E.	206 Meigs St., Rochester, N. Y.	1916
BARBER, PROF. MARSHALL A.	Univ. of Kansas, Rosedale, Kan.	1906
‡BARBOUR, F. A., C. E.	1121 Tremont Bldg., Boston, Mass.	1900
BARBOUR, MRS. NORAH JOHNSON	37 Batterymarch St., Boston, Mass.	1915
BARNES, A. S., JR., M. D.	210 Cent. Nat. Bldg., St. Louis, Mo.	1915
BARNES, H. J., M. D.	429 Beacon St., Boston, Mass.	1896
BARNES, T. H.	1646 Whitehall Bldg., New York City	1910
BARNEY, S. E.	346 Whitney Ave., New Haven, Conn.	1914
BARRICK, CALVIN W., M. D.	Birdsall, N. Y.	1915
BARRY, MISS ANNA L., R. N.	State Health Dept., Albany, N. Y.	1915
BARTHOLOMEW, H. S., M. D.	103 Main St., West, Lansing, Mich.	1916
BARTLETT, C. W.	508 Oak Ave., Tampa, Fla.	1914
BARTLETT, MURRAY, M. D.	357 Gral Luna, Manila, P. I.	1915
*‡BARTOW, EDWARD	Univ. of Illinois, Urbana, Ill.	1905
BASHORE, HARVEY B., M. D.	West Fairview, Pa.	1897
BASS, F. H.	429 Union St., South East, Minneapolis, Minn.	1907
*BASSETT, VICTOR H., M. D.	Savannah, Ga.	1912
BATEMAN, PROF. ARTHUR	10–12 West Ontario St., Chicago, Ill.	1915
*BATES, CARLETON	United States Glue Co., Milwaukee, Wis.	1914
*BATON, W. U. C.	528 South Lang Ave., Pittsburg, Pa.	1908
§BATT, WILMER R., M. D.	2138 North 2d St., Harrisburg, Pa.	1907
BATZELL, PAUL E.	181 Franklin St., Buffalo, N. Y.	1915
BAZZONI, PROF. C. B.	Care American Express Co., 6 Haymarket St., London, England	1914

BEACH, DE MOTT C.	175 Jay St., Albany, N. Y.	1914
BEAGLE, FENIMORE D.	State Health Dept., Albany, N. Y.	1915
BEARD, J. HOWARD, M. D.	503 South Race St., Urbana, Ill.	1914
BEARD, PROF. R. O.	Univ. of Minnesota, Minneapolis, Minn.	1914
*BECKWITH, T. D.	Agricultural College, Corvallis, Ore.	1911
BEEBE, HENRY E., M. D.	Sidney, Ohio	1882
*BEEBE, W. L., M. D.	Lowry Annex, St. Paul, Minn.	1907
BEER, JAMES A., M. D.	55 East State St., Columbus, Ohio	1915
††BEGG, PROF. R. B. H.	Virginia Polytechnic Institute, Blacksburg, Va.	1912
*§BEITLER, F. V., M. D.	Ridge Ave., Hallthrop, Md.	1911
BELAN, MISS LAETITIA LOUISA	666 Diversey Bldg., Chicago, Ill.	1914
‡BELL, F. D.	39 West 38th St., New York City	1907
*BELL, GORDON, M. D.	Winnipeg, Man.	1899
*†BELL, R. W.	350 Davenport Rd., Toronto, Ont.	1908
BELL, W. G.	609 West Main St., Gainesville, Fla.	1914
BENEDICT, CHARLES C., M. D.	Anchorage, Alaska	1916
BENNETT, A. G., M. D.	Connecticut Ave., Greenwich, Conn.	1914
†BENSEL, W., M. D.	105 West 74th St., New York City	1913
BENTLEY, D. B., M. D.	Sarnia, Ont.	1915
BENTZ, CHARLES A., M. D.	84 Orange St., Buffalo, N. Y.	1916
BERGER, FREDERICK W.	2200 Essex St., Baltimore, Md.	1916
BERGEY, DAVID H.	206 South 53d St., Philadelphia, Pa.	1915
BERNHAGEN, LEWIS OTTO	1502 Second Ave., South, Minneapolis, Minn.	1914
BERNIER, ARTHUR, M. D.	Laval University, St. Denis St., Montreal, Que.	1914
BERRY, CHARLES WHITE, M. D.	572 Forty-seventh St., Brooklyn, N. Y.	1914
BESEMER, A. M., B. S.	324 College Ave., Ithaca, N. Y.	1915
*BEYER, H. G., M. D.	The Marlborough, Washington, D. C.	1910
†BIERRING, WALTER L., M. D.	Equitable Bldg., Des Moines, Iowa	1913
BIGELOW, W. D.	1739 H St., North West, Washington, D. C.	1914
†BIGGS, HERMANN M., M. D.	113 West 57th St., New York City	1913
*BILLINGS, F. H.	Univ. of Kansas, Lawrence, Kan.	1912
*BILLINGS, J. S., M. D.	149 Center St., New York City	1905
‡BINGHAM, DON W.	621 Oakland Bldg., Lansing, Mich.	1914
BIRD, U. S., M. D.	P. O. Box 792, Tampa, Fla.	1914
*‡BIRDSALL, LEWIS I.	Supt. Filtrations, St. Anthony Falls Sta., Minneapolis, Minn.	1912
*BIRGE, E. G.	State Health Board, Tampa, Fla.	1907
BISHOP, ROBT. H., JR., M. D.	501 St. Clair Ave., Cleveland, Ohio	1912
BISSELL, WILLIAM G., M. D.	1467 Amherst St., Buffalo, N. Y.	1914
BIZE, L. A., M. D.	Citizens Bank Bldg., Tampa, Fla.	1914
†BLACK, J. T., M. D.	285 Montauk Ave., New London, Conn.	1914
*BLANCK, F. C.	Bureau of Chemistry, Washington, D. C.	1911
BLISS, CHAS. L.	Board of Health, Detroit, Mich.	1915
†BLUE, RUPERT, M. D.	3 B St., Washington, D. C.	1912
BOARDMAN, W. H.	426 Walnut St., Philadelphia, Pa.	1914
*‡BOLDUAN, C. F., M. D.	139 Center St., New York City	1912
*†BOLLING, GEORGE E.	City Hall, Brockton, Mass.	1900
BOLLING, R. C.	Dublin Rd., Greenwich, Conn.	1915
*BONNET, FREDERIC, JR.	22 Dayton St., Worcester, Mass.	1913
BOOKER, WARREN H.	State Health Board, Raleigh, N. C.	1912
BOOTH, JOHN T., M. D.	1110 Capitol St., Richmond, Va.	1915
BOSWELL, HENRY, M. D.	Booneville, Miss.	1916
BOSWORTH, ROBINSON, M. D.	824 Lowry Bldg., St. Paul, Minn.	1914

BOTELER, GEORGE MCCRARY	825½ Frederick Ave., St. Joseph, Mo.	1914
BOTSFORD, C. P., M. D.	219 Collins St., Hartford, Conn.	1911
†BOUCHER, S., M. D.	412 Rue St. Denis, Montreal, Que.	1914
BOUDREAU, FRANK G., M. D.	305 Seventeenth Ave., Columbus, Ohio	1916
BOUTON, OTIS Z., M. D.	Main St., Fultonville, N. Y.	1915
BOW, MALCOLM R., M. D.	Regina, Sask.	1915
BOWEN, D. C.	707 Fourth Ave., Asbury Park, N. J.	1915
*‡BOWLES, J. T. B.	39 West 38th St., New York City	1907
BOWMAN, WALDO M.	319 Superior St., Toledo, Ohio	1915
BOWMAN, WM. F.	East Orange, N. J.	1915
BOYCHEFF, G. T., M. D.	1107 Milton Ave., Solvay, N. Y.	1915
*BOYD, MARK F., M. D.	Univ. of Iowa, Iowa City, Iowa	1913
BOYNTON, CLARENCE N., M. A.	311–316 Goodrich Bldg., Phoenix, Ariz.	1916
BRADFORD, G. D., M. D.	Cayuga St., Homer, N. Y.	1915
BRADLEY, D. M., M. D.	Way Cross, Ga.	1914
BRAMLEY, HARRY E.	39–41 West 38th St., New York City	1912
BRANSFIELD, P. E.	18 Marlborough St., Portland, Conn.	1914
BRASWELL, JAMES C., JR.	Nashville, N. C.	1915
BRAUNNAGEL, JULIUS, M. D.	Box 925, San Antonio, Tex.	1890
BRAY, PROF. W. J.	1303 East Scott St., Kirksville, Mo.	1915
*BREED, ROBT. S.	N. Y. Experiment Station, Geneva, N. Y.	1909
BREM, WALTER V.	932 Maltman Ave., Los Angeles, Cal.	1915
**BREWER, ISAAC W., M. D.	Geneva, N. Y.	1915
BRIDGE, NORMAN, A. M., M. D.	10 Chester Pl., Los Angeles, Cal.	1915
BRIGGS, A. B., M. D.	Ashaway, R. I.	1913
BRIGGS, EDWARD F., M. D.	Bedford Hills, N. Y.	1915
BRINK, F. A., M. D.	1212 East Lee St., Pensacola, Fla.	1914
*BRISTOL, L. D., M. D.	Univ. of North Dakota, University, N. D.	1914
BROOKS, JAMES E.	6 Wildwood Ter., Glen Ridge, N. J.	1912
BROOKS, P. B.	32 East Main St., Norwich, N. Y.	1915
*BROWN, CLAUDE P., M. D.	38 East Logan Ave., Glenolden, Pa.	1912
BROWN, E. W., M. D.	U. S. S. "Bushnell," care The Postmaster, New York City	1914
BROWN, H. A., M. D.	306 Fourth St., South East, Washington, D. C.	1913
*BROWN, HERBERT R.	47 Hamstead Rd., Forest Hills, Boston, Mass.	1910
BROWN, JAMES R.	47 West 42d St., New York City	1915
BROWN, JOSEPH R., M. D.	Seward, N. Y.	1915
BROWN, LAWRASON, M. D.	104 Main St., Saranac Lake, N. Y.	1915
BROWN, LUCIUS P., M. D.	Centre and Walker Sts., New York City	1915
*‡BROWN, R. H.	Engineering Bldg., Columbia University, New York City	1907
BROWN, W. E.	53 Oxford St., Cambridge, Mass.	1915
BROWN, WALTER E.	Box 96, Noblesville, Ind.	1915
BROWN, WALTER H., M. D.	10 Remington St., Cambridge, Mass.	1915
BROWNE, JAMES ALEXANDER, M. D.	364 Van Houten St., Paterson, N. J.	1914
*‡BROWNE, W. W.	Coll. of the City of N. Y., 139th St., New York City	1911
BRUMFIELD, W. A., M. D.	1112 Wise St., Lynchburg, Va.	1915
BRUNDAGE, N. E., M. D.	Delphos, Ohio	1916
†BRUNNER, WM. F., M. D.	City Hall, Savannah, Ga.	1914
‡§BRYCE, PETER H., M. D.	Dept. of Interior, Ottawa, Ont.	1883
†BUCK, A. W.	1 Beacon St., Boston, Mass.	1914
*†BUCKLAND, THOMAS A.	9 Municipal Court Bldg., St. Louis, Mo.	1910
*BULL, IRVING C.	100 Maiden Lane, New York City	1912
*‡BULLARD, THOMAS E., M. D.	100 Church St., Schuylerville, N. Y.	1914

*‡Bunker, John W. M., M. D.	Care Digestive Ferments Co., 20 Locust St., Detroit, Mich.	1911
Burkart, John L., M. D.	*See Michigan State Health Board*	
*Burnett, Clough T., M. D.	302 Mercantile Bank Bldg., Boulder, Colo.	1913
Burns, Harry B., M. D.	Fulton Bldg., Pittsburgh, Pa.	1915
Burns, Richard G., M. D.	8 Dunlap Ave., Pittsburgh, Pa.	1915
Burr, Daniel S.	143 Court St., Binghamton, N. Y.	1915
*§Burrage, Prof. Severance	Care Ely Lilly & Co., Indianapolis, Ind.	1909
*Burton, Lawrence V.	434 Temple St., New Haven, Conn.	1914
*‡Buswell, A. M.	Columbia University, New York City	1914
*Buttles, E. H., M. D.	Burlington, Vt.	1912
Buzzell, R. S.	80 East 5th St., Flint, Mich.	1914
*‡Caird, Jas. M.	271 River St., Troy, N. Y.	1900
Cairns, A. A., M. D.	S. E. Cor. 7th and Medary Aves., Philadelphia, Pa.	1914
Cal. State Board of Health	Box 587, Sacramento, Cal.	1916
Cameron, R. L., M. D.	2109 Elm St., Youngstown, Ohio	1915
†Campbell, Albert E., M. D.	Railroad Health Officer, Illinois Central R. R. Co., Chicago, Ill.	1913
Campbell, H. M.	3d and Kilgour Sts., Cincinnati, Ohio	1914
†Cannon, W. F.	1914 Pennsylvania Ave., Denver, Colo.	1913
Capron, V. J., M. D.	930 Henry Bldg., Seattle, Wash.	1916
Carlson, Arthur J., M. D.	1003 Detta Ave., Escanaba, Mich.	1915
Carney, Andrew, Jr.	121 Prospect St., Westfield, N. J.	1915
Carpenter, William F.	1316 Delamere Pl., Brooklyn, N. Y.	1915
Carpenter, W. J., M. D.	Katanah, N. Y.	1914
†§‖Carr, E. Arthur, M. D.	516 Bankers Life Bldg., Lincoln, Neb.	1910
Carroll, Thomas B., D. V. S.	106 North 2d St., Wilmington, N. C.	1915
‡Carson, Harry Y.	90 West St., New York City	1914
*Cartaya, José, M. D.	Hospital Las Animas, Havana, Cuba	1911
*Carter, Prof. Charles	Parsons College, Fairfield, Iowa	1916
Carter, E. B.	810 East 25th St., Indianapolis, Ind.	1916
Cary, R. J., B. S., M. D.	Mountain View Sanatorium, Lake View, Wash.	1916
‡Case, George W.	3142 Avalon St., Pittsburgh, Pa.	1915
Caswell, Harlan O.	81 North Main St., Ft. Atkinson, Wis.	1916
*‡Catlett, G. F.	Director of Laboratory, County Board of Health, Wilmington, N. C.	1914
†Caverley, Chas. S., M. D.	Rutland, Vt.	1894
††Cauchon, N.	Canada Life Bldg., Ottawa, Ont.	1912
Chaddock, Prof. Robt. E.	403 West 115th St., New York City	1915
§Chalmers, Henry	State Health Dept., Albany, N. Y.	1914
Chamot, E. M.	Cornell University, Ithaca, N. Y.	1905
Champion, Merrill E., M. D.	50 Phillips St., Wollaston, Mass.	1915
Chandler, Prof. C. F.	Columbia University, New York City	1872
†Chandler, David D.	376 Roseville Ave., Newark, N. J.	1896
†Chandler, N. J. R.	104 East Front St., Plainfield, N. J.	1914
‡Chapman, F. T.	104 West 42d St., New York City	1912
†§Chapin, C. V., M. D.	Providence, R. I.	1886
Chapman, G. A., M. D.	23 Elm St., Glen Falls, N. Y.	1915
*‡Chase, E. S.	State Health Dept., Albany, N. Y.	1909
‡Chase, John C.	Derry Village, N. H.	1890
Chase, J. Frank	200 Equitable Bldg., Boston, Mass.	1915
Cheatham, Arch M., M. D.	705 Cleveland St., Durham, N. C.	1914
*†Chesley, A. J., M. D.	State Health Board, Minneapolis, Minn.	1909

‡Chester, John N. ..... Union Bank Bldg., Pittsburgh, Pa. 1911
Chichester, C. E. L. ..... 936 Madison Ave., Albany, N. Y. 1915
Chidester, W. S. ..... Punta Gorda, Fla. 1913
Chilson, Henry L., M. D. ..... 408 Main St., Bradentown, Fla. 1914
Christian, Mrs. Leonora H. ..... 404 South 8th St., Minneapolis, Minn. 1915
City Board of Health ..... City Hall, Indianapolis, Ind. 1915
‡City Water Board ..... 7 Exchange St., Auburn, N. Y. 1915
Civic League, Colorado Springs ..Care Mrs. C. J. Wright, 1719 North Nevada Ave., Colorado Springs, Colo. 1915
Claffy, Thomas H. ..... 10057 Longwood Dr., Chicago, Ill. 1914
Clapp, Sidney K. ..... Ashokan, N. Y. 1914
Clark, Edward, M. D. ..... 573 Elliott Sq., Buffalo, N. Y. 1914
*††Clark, H. W. ..... 502 State House, Boston, Mass. 1896
*Clark, P. F. ..... Univ. of Wisconsin, Madison, Wis. 1906
*†Claxton, William A., M. D. ..... Canadian Medical Service, Cairo, Egypt 1914
Cleghorn, Guy F. ..... Mineola, N. Y. 1915
‡Cleveland, H. Burdett ..... 287 Western Ave., Albany, N. Y. 1914
Clinton, George ..... 126 East Bridge St., Belleville, Ont. 1912
*Clore, Lex B. ..... Address unknown 1913
*Closson, Oliver E. ..... 336 Hurburt St., Detroit, Mich. 1908
*Cobb, Chas. N., Supt. ..... Water Works, Kankakee, Ill. 1908
*Cobleigh, William M., M. D. ..... 909 South 3d Ave., Bozeman, Mont. 1914
‡Coburn, William Haskins ..Care Engineering Dept., Amer. Woolen Co., Wash. Mills, Lawrence, Mass. 1914
Cochran, William F. ..... Woodbrook, Md. 1915
Codding, Edwin H. ..... New Rochelle, N. Y. 1913
Cogswell, William F., M. D. ..... Helena, Mont. 1913
§Cohen, J. X. ..... 104 City Hall, Syracuse, N. Y. 1915
§||Cohen, Morris ..... 68 East 118th St., New York City 1914
Colby, Bern D., M. D. ..... Sudbury, Vt. 1916
†§Cole, Hills, M. D. ..... 1748 Broadway, New York City 1907
Cole, R. W. E., M. D. ..... York Village, Me. 1914
Collins, Herbert O. ..... City Hospital, Minneapolis, Minn. 1914
*Collins, Katherine R., M. D. ..... State Health Board, Atlanta, Ga. 1910
Collins, William Bell, M. D. ..... State Health Dept., Austin, Tex. 1915
Colson, Henry C., Jr. ..... Abington, Mass. 1914
†Colton, Max J., M. D. ..... Cumberland, Md. 1913
*†§Commission of Conservation, Charles A. Hodgetts, M. D. ..... Ottawa, Canada 1905
Committee of Fourteen ..... 27 East 22d St., New York City 1915
‡Conant, Elbridge R. ..... 209 West 34th St., Savannah, Ga. 1914
Congdon, Charles F., M. D. ..... 29 Willow St., Mystic, Conn. 1916
*Conn, Prof. H. W. ..... Middletown, Conn. 1907
*Connell, W. T., M. D. ..... 11 Arch St., Kingston, Ont. 1908
*†Connolly, R. N., M. D. ..... City Hospital, Newark, N. J. 1898
Consumers' League of Massachusetts, Inc. ..... 4 Joy St., Boston, Mass. 1915
Conway, John A., M. D. ..... 32 Broad St., Hornell, N. Y. 1914
**Cooke, Dwight I. ..... 111 South Jefferson St., Chicago, Ill. 1915
Cooke, Lane B., M. D. ..... Care American Consul, Vera Cruz, Mex. 1915
Cook, Dewitt, Jr. ..... 70 Hawthorne Ave., East Orange, N. J. 1914
Coolidge, Miss Ellen W. ..... 81 Marlboro St., Boston, Mass. 1915
Coote, H. L. B., M. D. ..... 312 East Michigan St., Michigan, Ind. 1915
Cornell, Walter S., M. D. ..... 729 City Hall, Philadelphia, Pa. 1915

Corwin, R. W., M. D.	Minniqua Hospital, Pueblo, Colo.	1913
Cousineau, Aimé	Health Dept., City Hall, Montreal, Que.	1915
*Coward, F. A., M. D.	1410 Senate St., Columbia, S. C.	1912
**Cox, Ernest H., M. D.	2047 East 9th St., Cleveland, Ohio	1915
Cox, Grover S., M. D.	Box 61, Tabor, N. C.	1914
Cox, J. F.	P. O. Box 307, Winnipeg, Man.	1908
Cox, John W., M. D.	414 University Ave., Grand Forks, N. D.	1914
§Cox, Robert Lynn	165 Broadway, New York City	1913
Craft, Clarence C., M. D.	Postou, S. C.	1914
‖Crampton, C. Ward, M. D.	431 Riverside Dr., New York City	1914
Crane Company, The	836 Michigan Blvd., Chicago, Ill.	1915
**†Crankshaw, Charles W., M. D.	Prudential Insurance Co., Newark, N. J.	1913
Crawford, B. E., M. D.	2215 Montrose Ave., Chicago, Ill.	1914
Creel, Richard H., M. D.	163 Dryades St., New Orleans, La.	1915
Cressman, Ralph G., M. D.	Oglesby, Ill.	1914
†§Crigler, Wallace P.	Ocala, Fla.	1914
*Crocker, Fred L.	Tenn. Coal Iron & R. R. Co., Birmingham, Ala.	1912
Crockett, Robert L., M. D.	131 Main St., Oneida, N. Y.	1915
Crockett, Sidney S.	Vanderbilt Campus, Nashville, Tenn.	1915
Croston, John F., M. D.	83 Emerson St., Haverhill, Mass.	1911
**‡Crowder, T. R., M. D.	Pullman Bldg., Chicago, Ill.	1905
Crowell, Miss Elizabeth F.	105 East 22d St., New York City	1915
§Crum, Frederick S.	751 Clifton Ave., Newark, N. J.	1907
†Crum, H. H., M. D.	City Hall Annex, Ithaca, N. Y.	1909
†Crumbine, S. J., M. D.	State House, Topeka, Kan.	1912
Cudderback, Edgar G., M. D.	Port Jervis, N. Y.	1915
Culbertson, R. B., M. D.	Dauphin, Man.	1913
Cuming, H. T., M. D.	Gloster, Miss.	1916
Cummins, Earl H.	45 Westland Ave., Boston, Mass.	1916
Cummins, Herschel B.	Seward, Neb.	1910
Curry, Grove P. M., M. D.	Mt. Kisco, N. Y.	1906
*Curtis, Francis Geo., M. D.	City Hall, West Newton, Mass.	1897
*Dalton, Charles F., M. D.	52 North Winooski Ave., Burlington, Vt.	1912
*†Daniels, F. E.	1409 North Front St., Harrisburg, Pa.	1909
Darling, Prof. Chester A.	Allegheny College, Meadville, Pa.	1915
Davidson, Alvin	366 Van Houten St., Passaic, N. J.	1910
‡Davis, Charles O.	422 Fourth Ave., Milwaukee, Wis.	1914
Davis, Joe Dyer, M. D.	State Health Dept., Austin, Tex.	1914
Davis, Michael M., Jr.	25 Bennett St., Boston, Mass.	1915
*Davis, Lewis	201 Hancock Ave., East, Detroit, Mich.	1913
Davis, Nelson C., M. D.	494 Rutherford Ave., Boston, Mass.	1914
Davis, William A., M. D.	Capitol Station, Austin, Tex.	1915
Davis, William H., M. D.	23 Beaumont St., Dorchester, Mass.	1911
Dawson, Charles F.	Jacksonville, Fla.	1914
Deacon, W. J. V.	1254 Polk St., Topeka, Kan.	1912
Dean, J. Atlee	5420 Baltimore Ave., Philadelphia, Pa.	1915
‡Dearholt, Hoyt E., M. D.	471 Van Buren St., Milwaukee, Wis.	1910
*‡Decker, A. Clinton	Box 790, Birmingham, Ala.	1911
‖De Forrest, Robert W.	30 Broad St., New York City	1912
De Grey, Frank, M. D.	Prov. Health Board, Victoria, B. C.	1914
De Kleine, William, M. D.	1007 East Michigan Ave., Lansing, Mich.	1915

†De Lano, William, M. D. ..... 510 South Union St., Grand Rapids, Mich. 1907
Dennis, S. C. ..... College Park, Md. 1915
†Denno, Willard J., M. D. ..... 16 Central Park, West, New York City 1914
*†Denny, Francis P., M. D. ..... 111 High St., Brookline, Mass. 1901
De Pree, Con ..... Holland, Mich. 1912
De Pree, James ..... 902 Chamber Commerce Bldg., Chicago, Ill. 1915
Derivaux, Robt. C., M. D. ..... 25th and E Sts., Washington, D. C. 1915
Dickinson, G. K., M. D. ..... 278 Montgomery St., Jersey City, N. J. 1905
Dickinson, Miss May B. ..... Trinity Ct., Dartmouth St., Boston, Mass. 1915
Dickson, Hugh F. ..... 26 Washington Ave., Covington, Tenn. 1914
†Diggett, E. W. ..... Tallahassee, Fla. 1911
Dike, I. A. M., M. D. ..... York, N. Y. 1915
*Dingle, J. H. ..... City Hall, Charleston, S. C. 1910
*‡Dittoe, William H. ..... Ohio State Board of Health, Columbus, Ohio 1913
§Dixon, Samuel G., M. D. ..... 1900 Race St., Philadelphia, Pa. 1905
Dobbs, Clarence H., M. D. ..... Asst. to State Health Officer, Jacksonville, Fla. 1914
Dodd, John M., M. D. ..... 610 Ellis Ave., Ashland, Wis. 1913
*Dodd, W. L. ..... 373 Garland Ave., Detroit, Mich. 1912
*Dole, Richard B. ..... U. S. Geological Survey, Washington, D. C. 1905
D'Olier, William L. ..... 702 Morris Bldg., Philadelphia, Pa. 1915
†Domingues, A. G., M. D. ..... Box 1131, Havana, Cuba 1911
Donaldson, Wellington ..... Birmingham Water Works, Birmingham, Ala. 1915
Donohoe, George ..... Cherokee State Hospital, Cherokee, Iowa 1915
*‡Doolittle, Roscoe E. ..... 109 Hillside Ave., Glen Ridge, N. J. 1912
Dossin, Albert P. ..... 37 North 4th St., Meriden, Conn. 1914
Doty, Alvah H., M. D. ..... 205 West 57th St., New York City 1896
†§Douglas, A. J., M. D. ..... City Health Dept., Winnipeg, Man. 1903
*Doupe, G. Lonsdale ..... Care C. P. R. R., Winnipeg, Man. 1906
‡Dowd, Wyllys E., Jr. ..... 111 Broadway, New York City 1912
†Dowling, Oscar W., M. D. ..... New Orleans, La. 1911
Downes, John R. ..... 48 Rock Ave., Plainfield, N. J. 1915
†§Downs, A. Sherman, M. D. ..... 139 Circular St., Saratoga, N. Y. 1914
§Drake, Chester F. ..... Filtration Works, Aspinwall, Pa. 1914
†§Drake, C. St. Clair, M. D. ..... Springfield, Ill. 1914
Dresser, Richard ..... 54 College St., Providence, R. I. 1915
Dresslar, Fletcher B., M. D. ..... Peabody College, Nashville, Tenn. 1911
*Dreyfus, William ..... 57 East 96th St., New York City 1905
Drinkwater, Ernest, C. E. ..... 588 Bird St., St. Lambert, Que. 1914
§Dublin, Louis I. ..... 1 Madison Ave., New York City 1912
Duffield, Thomas J. ..... P. O. Box 272, Summit, N. J. 1915
*†Duncan, Ellis M., M. D. ..... City Hall, Birmingham, Ala. 1909
Dungan, Samuel O. ..... 1100 East 15th St., Indianapolis, Ind. 1913
*Dunham, Edward K., M. D. ..... 35 East 68th St., New York City 1905
†§Durgin, Samuel H., M. D. ..... Millbrook, Mass. 1875
Durkee, Miss C. Josephine ..... 186 State St., Albany, N. Y. 1915
†Duryee, Charles Chauncey, M. D. ..... 1352 Union St., Schenectady, N. Y. 1914
†Dutton, C. E., M. D. ..... 602 Cicoller Ave., Minneapolis, Minn. 1913
†‡Dyer, Elbridge G. ..... 1905 East 73d St., Cleveland, Ohio 1911

†Eakins, Wallace T. ..... 101 Hamilton St., New Brunswick, N. J. 1914
Eason, Sam. E., M. D. ..... New Albany, Miss. 1914
Eichel, Otto R., M. D. ..... 28 Chestnut St., Albany, N. Y. 1915

‡Earl, George G. ..... 502 City Hall Annex, New Orleans, La. 1902
**Easton, Ernest D. ..... 45 Clinton St., Newark, N. J. 1915
*Eaton, Charles A., M. D. ..... 612 Congress St., Portland, Me. 1912
Ebersole, William G., M. D. ..... 800 Schofield Bldg., Cleveland, Ohio 1914
*‡Eddy, Harrison P. ..... 14 Beacon St., Boston, Mass. 1910
†Edmison, John H., M. D. ..... 216 Thirteenth St., Brandon, Man. 1913
Prov. Med. Officer of Health ..... Edmonton, Alta. 1915
Edsall, Frank H., M. D. ..... City Health Bureau, Jersey City, N. J. 1914
†§Edwards, James F., M. D. ..... Bureau of Infectious Diseases, Pittsburgh, Pa. 1907
*†Edwards, Martin R., M. D. ..... 7 Marlborough St., Boston, Mass. 1914
Eisenberg, Arthur A., M. D. ..... 1708 Third St., North West, Washington, D. C. 1915
*Elgin, W. F., M. D. ..... City Health Board, Glenolden, Pa. 1900
Ellison, J. Austin ..... 6th and King Sts., Wilmington, Del. 1915
**Elliott, Ralph W., M. D. ..... 10509 Euclid Ave., Cleveland, Ohio 1915
Eliz. McCormick, Mem. Fund ..... 315 Plymouth Ct., Chicago, Ill. 1915
Elmore, Charles G., M. D. ..... Room 312, C. & N. W. Terminal, Chicago, Ill. 1915
*Ellms, J. W. ..... 2812 Madison Rd., Cincinnati, Ohio 1897
Elwood, E. S. ..... The Capitol, Albany, N. Y. 1915
‡Emerson, Charles A., Jr. ..... State Health Board, Harrisburg, Pa. 1907
Emerson, Guy C. ..... 5 Agassiz Park, Boston, Mass. 1914
†§Emerson, Haven, M. D. ..... 120 East 62d St., New York City 1914
*†Emerson, Herbert C., M. D. ..... 145 Chestnut St., Springfield, Mass. 1899
Engel, P. W. ..... 38 South Dearborn St., Chicago, Ill. 1916
Ernst, Harold C., M. D. ..... Harvard Medical School, Boston, Mass. 1915
Escoto, Fred G., M. D. ..... 113 Independence St., Mantanzos, Cuba 1911
‡Estabrook, Arthur F. ..... 15 State St., Boston, Mass. 1909
Evans, E. Geo. ..... 522 Van Dyke St., Detroit, Mich. 1915
§Evans, E. Walter ..... 240 Oak St., Cincinnati, Ohio 1915
*Evans, H. D., M. D. ..... 4 Lambard Ct., Augusta, Me. 1905
*†‡§Evans, William A., M. D. ..... 906 Tribune Bldg., Chicago, Ill. 1915
Everhardy, Jacob L., M. D. ..... Axa Bldg., Leavenworth, Kan. 1913
Eye, George Edwin, M. D. ..... Marion, Kan. 1914

*Fabela, Octavino G., M. D. ..... 10 De La Violeta, No. 8, Mexico, Mex. 1901
Fahey, Edward W., M. D. ..... 217 New Jersey Bldg., Duluth, Minn. 1915
*Fales, Almon L. ..... 15 Westbourne Rd., Newton Center, Mass. 1910
Farnam, Prof. Henry Walcott ..... 43 Hillhouse Ave., New Haven, Conn. 1914
Farkas, Morris, M. D. ..... 266 Watchung Ave., West Orange, N. J. 1915
Farquhar, A. B. ..... York, Pa. 1880
§||Farrand, Livingston, M. D. ..... Univ. of Colorado, Boulder, Colo. 1910
Feezer, L. W. ..... 5 Sumner Rd., Cambridge, Mass. 1915
Feiss, Paul L. ..... 12600 Cedar Rd., Cleveland Heights, Ohio 1915
†Fell, Alton S., M. D. ..... 312 East State St., Trenton, N. J. 1908
Ferguson, Franklin A., M. D. ..... 705 Congress St., Portland, Me. 1912
Ferguson, Harry F. ..... State Water Survey, Urbana, Ill. 1916
Fernando, Montilla J. ..... Ayuntamiento Bldg., San Juan, Porto Rico 1915
*Ferry, N. S., M. D. ..... 430 Montclair Ave., Detroit, Mich. 1910
‡Fetherston, John T. ..... 16 Lenox Pl., New Brighton, N. Y. 1914
Fiedler, Otho, M. D. ..... Sheboygan, Wis. 1913
†Finch, James H., M. D. ..... 101 North Elm St., Champaign, Ill. 1914
Finigan, Mrs. Elizabeth M. ..... 42 Phelps St., Lyons, N. Y. 1915
||Finley, Carlos E., M. D. ..... Havana, Cuba 1911

Fish, Lewis, M. D.	86 Day St., Fitchburg, Mass.	1915
Fishburne, Skottowe B., M. D.	1400 Hampton St., Columbia, S. C.	1915
‡Fisher, E. A.	Rochester, N. Y.	1915
‡§Fisher, Prof. Irving	New Haven, Conn.	1903
Fisher, Seaver Z., M. D.	Jamestown St., Randolph, N. Y.	1915
§Fisk, Eugene Lyman	25 West 45th St., New York City	1915
*§Fiske, C. N., M. D.	Navy Dept., Washington, D. C.	1910
Fitch, Clifford P.	107 Brandon Pl., Ithaca, N. Y.	1915
*Fitzgerald, Prof. J. G.	Univ. of Toronto, Toronto, Ont.	1912
Fitzgerald, James O., M. D.	1110 Capitol St., Richmond, Va.	1914
*Fitz-Randolph, R. B., M. D.	17 State St., Trenton, N. J.	1905
Flanagan, Edward L., M. D.	Emporia, Va.	1915
Flanary, David L., M. D.	1027 Troy St., Dyersburg, Tenn.	1914
Fleming, Miss Georgia Elizabeth	1107 West Oregon St., Urbana, Ill.	1914
Flick, Lawrence F., M. D.	732 Pine St., Philadelphia, Pa.	1890
Flinn, Thos. W. P., M. D.	84 Morris St., Halifax, N. S.	1915
*Flocken, Charles F., D. V. M.	2624 Emerson Ave., South, Minneapolis, Minn.	1904
Floyd, Meldrum B., M. D.	471 Forest Ave., Dayton, Ohio	1915
Foley, Miss Edna L.	104 South Michigan Ave., Chicago, Ill.	1915
||Folks, Homer	428 Hawthorne Ave., Yonkers, N. Y.	1911
Follin, James W.	621 Oakland Bldg., Lansing, Mich.	1914
†Folsom, William C.	2523 Essex Pl., Cincinnati, Ohio	1911
*Foote, Charles J., M. D.	60 Elm St., New Haven, Conn.	1895
*Forbes, F. B.	540 State House, Boston, Mass.	1905
Force, Prof. J. N.	Univ. of California, Berkeley, Cal.	1911
†‡Ford, C. E., M. D.	Care General Chemical Co., 25 Broad St., New York City	1910
†Fort, A. G., M. D.	Tifton, Ga.	1911
Foster, Harry E., M. D.	609 Santa Ray Ave., Oakland, Cal.	1915
Foster, R. F., M. D.	29 North Portage St., Westfield, N. J.	1915
†Foster, W. Brownley, M. D.	Roanoke, Va.	1908
Foster, Prof. William Trumbower	707 Coleman St., Easton, Pa.	1916
Fox, Carroll, M. D.	Hygienic Laboratory, 25th and E Sts., Washington, D. C.	1915
*Fox, Herbert, M. D.	3209 Locust St., Philadelphia, Pa.	1915
||Fox, H. F.	50 Union Sq., New York City	1911
Fox, Richard T.	20 East Goethe St., Chicago, Ill.	1916
Foyle, Timothy F.	353 Warren St., Newark, N. J.	1914
Francine, A. P., M. D.	264 South 21st St., Philadelphia, Pa.	1915
Francis, Walter J.	260 St. James St., Montreal, Que.	1914
Frank, Leslie C.,	Hygienic Laboratory, 25th and E Sts., North West, Washington, D. C.	1914
§Frankel, Lee K., Ph. D.	1 Madison Ave., New York City	1909
Frankforter, G. B., M. D.	525 River Rd., South East, Minneapolis, Minn.	1915
†Frantz, A. E., M. D.	504 Delaware Ave., Wilmington, Del.	1909
*Freas, Raymond	1418 Linden Ave., Baltimore, Md.	1913
*†§Freeman, A. W., M. D.	U. S. P. H. Service, Cincinnati, Ohio	1907
French, Frank E.	4907 Stewart Ave., Cincinnati, Ohio	1914
†§Friedrich, Martin, M. D.	3226 West 14th St., Cleveland, Ohio	1905
Fricks, L. D.	Hygienic Laboratory, Washington, D. C.	1915
*Fritze, Lucias A.	City Y. M. C. A., Moline, Ill.	1913
†Fronczak, Francis E., M. D.	Health Dept., Buffalo, N. Y.	1910
*Frost, William D.	310 North Orchard St., Madison, Wis.	1904
*Frost, W. H., M. D.	3d and Kilgour Sts., Cincinnati, Ohio	1909
Fuertes, James H.	140 Nassau St., New York City	1913

*Fuller, Caleb A.	71 Charles Field St., Providence, R. I.	1905
*‡Fuller, George W.	170 Broadway, New York City	1892
*§Fulton, J. S., M. D.	16 North Saratoga St., Baltimore, Md.	1897
Furbush, C. L., M. D.	1501 Spruce St., Philadelphia, Pa.	1911
Furman, Davis, M. D.	Greenville, S. C.	1914
Furniss, Henry W., M. D.	American Legation, Port Au Prince, Hayti	1900
†Furstman, Jacob W.	City Hall, La Crosse, Wis.	1912
Gable, Isaac C., M. D.	46 South Beaver St., York, Pa.	1897
*‡Gage, S. De M.	310 State House, Providence, R. I.	1901
*Gaines, Richard H.	49 Lafayette St., New York City	1909
Gale, George B., M. D.	457 Mt. Prospect Ave., Newark, N. J.	1909
Gallivan, William J., M. D.	743 Broadway, South Boston, Mass.	1912
Garcia, Alexander, M. D.	2000 Arch St., Philadelphia, Pa.	1915
‡§Garcia, Carlos M., M. D.	36 Zamora St., Vera Cruz, Mex.	1909
Garcia, Manuel C. Y., M. D.	26 Eighth St., Havana, Cuba	1915
Garrison, Ira M., M. D.	East Greenbush, N. Y.	1915
*Gaub, John	2701 North Capitol St., Washington, D. C.	1912
Gavitt, Andrew J.	151 North Ave., Plainfield, N. J.	1915
†Gebhardt, Frederick H., M. D.	43 Washington St., Rutland, Vt.	1914
*Gehrmann, Adolph, M. D.	3815 Ellis Ave., Chicago, Ill.	1895
*Geidel, Carl D.	Chem. Bldg., Univ. of Wisconsin, Madison, Wis.	1914
Geier, Otto P., M. D.	Cincinnati Milling Machine Co., Oakley, Cincinnati, Ohio	1916
George, W. Egerton, M. D.	North Bay, Ont.	1912
‡Gerhard, William P., M. D.	Forty-second St. Bldg., New York City	1880
Germer, Hermann G.	221 North Main St., Canastota, N. Y.	1915
‡Gery, Chas. G.	5336 Wingohocking Ter., Germantown, Pa.	1910
Giese, Otto Erich	4 and 6 Cedar St., New York City	1915
Gilles, Dewitt Clinton	City Hall, Savannah, Ga.	1914
Gillespie, C. G.	Univ. of California, Berkeley, Cal.	1915
Gillespie, Julian M., M. D.	163 Dryades St., New Orleans, La.	1915
†Gillette, Omer R., M. D.	7 Bank Bldg., Colorado Springs, Colo.	1912
Gilleylen, J. D., M. D.	Jackson, Miss.	1916
**†Gillihan, Allen F., M. D.	Oakland, Cal.	1913
*Gilliland, S. H., M. D.	Marietta, Pa.	1900
Giltner, Prof. Ward	340 Oak Hill Ave., East Lansing, Mich.	1914
Gladding, Raymond D.	Gladding Pl., Fall River, Mass.	1915
†Glenn, John M.	130 East 22d St., New York City	1910
§Glover, James W.	620 Oxford Rd., Ann Arbor, Mich.	1914
‡§Godfrey, Edward S., Jr., M. D.	211 Goodrich Bldg., Phoenix, Ariz.	1910
‡Godfrey, Hollis	Drexel Institute, 32d and Chestnut Sts., Philadelphia, Pa.	1913
*Goldberger, Jos., M. D.	25th and E Sts., Washington, D. C.	1909
†Goldwater, S. S., M. D.	Mt. Sinai Hospital, New York City	1902
*†Goler, G. W., M. D.	173 Alexander St., Rochester, N. Y.	1900
†Goltman, M., M. D.	410 Union Ave., Memphis, Tenn.	1912
‡Goodell, John Milton	106 Lorraine Ave., Upper Montclair, N. J.	1912
‡Goodnough, X. H.	State House, Boston, Mass.	1914
†§Gordon, James R.	Deputy State Registrar, Raleigh, N. C.	1909
** *Gordon, John Boyle	235 Elm St., Buffalo, N. Y.	1914
*Gordon, R. I.	1301 Florida Ave., Tampa, Fla.	1914
*Gorham, Fred P.	Brown University, Providence, R. I.	1899

†Gorter, Nathan R., M. D. — 1 West Biddle St., Baltimore, Md. — 1914
Gould, Charles M., M. D. — City Health Officer, Superior, Wis. — 1914
†Gould, William H. — Lucas County Court House, Toledo, Ohio — 1913
*Govers, Frank X. — Chemists' Club, New York City — 1914
*Graf, A. V. — 3837 Wyoming St., St. Louis, Mo. — 1914
Graham, Douglas S. — 5336 Willis Ave., Dallas, Tex. — 1916
** *‡‖Graham-Rogers, C. T. — 381 Fourth Ave., New York City — 1912
†§Gram, Franklin C., M. D. — 849 Humboldt St., Buffalo, N. Y. — 1907
Grandfield, Robert E. — 124 Brown Ave., Roslindale, Mass. — 1915
§Grandy, Charles R., M. D. — 101 Free Mason St., Norfolk, Va. — 1907
‡Grant, William — 2420 R St., Lincoln, Neb. — 1913
†§Grassick, James, M. D. — Grand Forks, N. D. — 1910
Graves, E. E., M. D. — 14 Elm St., Penacook, N. H. — 1886
Graves, Kenneth D. — City Hall, Richmond, Va. — 1914
Gray, George M. — 286 Third St., Cambridge, Mass. — 1914
Gray, H. F. — 208 Ramona Bldg., Palo Alto, Cal. — 1911
‡Gray, Samuel M. — 10 Weybosset St., Providence, R. I. — 1891
Gray, Thomas N., M. D. — William and Plane Sts., Newark, N. J. — 1916
‡Greeley, Samuel A. — 200 Chestnut St., Winnetka, Ill. — 1912
Green, Frederick R., M. D. — 535 North Dearborn St., Chicago, Ill. — 1915
*‡Green, F. W. — Little Falls, N. J. — 1915
Greenberg, D. — Yale School of Medicine, New Haven, Conn. — 1914
*Greenfield, Miss Myrtle — 1244 Louisiana St., Lawrence, Kan. — 1913
Gregory, Charles E. — 100 West Main St., Mt. Kisco, N. Y. — 1915
‡Gregory, John H. — 170 Broadway, New York City — 1912
Griffin, Chas. A. — Dept. of Health, Eastman Park Laboratory, Poughkeepsie, N. Y. — 1915
Grimm, Randolph M., M. D. — U. S. P. H. Service, Spartanburg, S. C. — 1915
*Grindly, Prof. Harry S. — Urbana, Ill. — 1910
*Grinnell, Francis B., M. D. — 240 Longwood Ave., Boston, Mass. — 1914
*Griswold, Don M. — Antigua, B. W. I. — 1914
Grossman, Gaison — 506 Central Ave., Rochester, N. Y. — 1915
Grubbs, Samuel B., M. D. — 15 Strathmore Rd., Brookline, Mass. — 1902
Gruener, Prof. Hippolyte — 2089 Cornell Rd., Cleveland, Ohio — 1914
§Guilfoy, W. H., M. D. — 141 Center St., New York City — 1907
Guiteras, Juan, M. D. — Las Animas Hospital, Havana, Cuba — 1902
§Guiteras, Ramon, M. D. — 80 Madison Ave., New York City — 1904
*Gundrum, Frederick F., M. D. — 1023 Tenth St., Sacramento, Cal. — 1913
Gunn, Mrs. Selskar M. — 60 Goden St., Belmont, Mass. — 1915
*†Gunn, Prof. Selskar M. — 60 Goden St., Belmont, Mass. — 1905

*Hachtel, F. W., M. D. — 122 West Lafayette St., Baltimore, Md. — 1909
Hagan, James J. — 331 Baldwin Ave., Jersey City, N. J. — 1916
*Haine, William — 11 Laurel St., Hartford, Conn. — 1914
Hale, Frank E. — Mt. Prospect Laboratory, Flatbush Ave. and Eastman Pk'y, Brooklyn, N. Y. — 1916
Hall, E. P., M. D. — Skaneateles, N. Y. — 1915
Hall, Harry R. — 16 West Saratoga St., Baltimore, Md. — 1915
Hall, John — 441 Main St., East Orange, N. J. — 1914
†§Hall, Pearl M., M. D. — 1067 Freemont Ave., Minneapolis, Minn. — 1908
‡Halsey, William H., M. D. — Washington, D. C. — 1911
*‖Hamilton, Alice, M. D. — 1312 Park Ave., Baltimore, Md. — 1913

*Hamilton, Herbert C.	Care Parke Davis & Co., Detroit, Mich.	1913
Hamlin, Fred E., M. D.	Stanton, Va.	1916
‡Hammer, B. W.	Iowa State College, Ames, Iowa	1909
Hamner, N. C.	Municipal Bldg., Dallas, Tex.	1915
Hand, E. Alexander, M. D.	35 Townsend St., Walton, N. Y.	1915
Hanford, Oliver P., M. D.	720 North Nevada Ave., Colorado Springs, Colo.	1913
Hanor, Welcome A., M. D.	118 East Erie Ave., Corning, N. Y.	1915
*Hanson, Henry, M. D.	317 West 10th St., Jacksonville, Fla.	1910
*‡Hansen, Paul	State Health Board, Engineering Bureau, Springfield, Ill.	1905
*Harding, H. A.	College of Agriculture, Urbana, Ill.	1908
Hardy, W. J., M. D.	3 South St., Belmont, N. Y.	1915
Harley, Mary, M. D.	Sweet Briar College, Sweet Briar, Va.	1914
Harmon, Gaius E., M. D.	Western Reserve University, 1353 East 9th St., Cleveland, Ohio	1914
§Harper, C. A., M. D.	15 Pickney St., Madison, Wis.	1904
Harper, Elmer E.	2404 East 30th St., Kansas City, Mo.	1915
Harrington, Francis E., M. D.	1106 P St., North West, Washington, D. C.	1910
Harris, Cummings, M. D.	City Health Dept., Memphis, Tenn.	1915
†Harris, D. L., M. D.	Metropolitan Bldg., St. Louis, Mo.	1908
Harris, Henry F., M. D.	State Health Board, Atlanta, Ga.	1914
**Harris, Louis I., M. D.	1855 Seventh Ave., New York City	1915
*Harris, Norman MacL., M. B.	Univ. of Chicago, Chicago, Ill.	1899
Harrison, Samuel Charles	1350 Liberty St., Jacksonville, Fla.	1914
Harrison, Shelby M.	130 East 22d St., New York City	1915
†Harte, Richard H., M. D.	1503 Spruce St., Philadelphia, Pa.	1914
Hart, W. L.	Madison Barracks, New York City	1916
§Hartloff, Chas. W., M. D.	Room 313, Int. Life Bldg., Evansville, Ind.	1913
Hartzell, Josiah	Canton, Ohio	1895
Harvey, P. W.	4608 Euclid Ave., Cleveland, Ohio	1912
Haskell, W. A., M. D.	Alton, Ill.	1883
‡Haskins, Charles A.	1732 Mississippi St., Lawrence, Kan.	1913
Hasseltine, H. E., M. D.	Hygienic Laboratory, Washington, D. C.	1916
†Hastings, Chas J., M. D.	Municipal Bldg., Toronto, Ont.	1911
*Hastings, Prof. Edwin G.	College of Agriculture, Madison, Wis.	1913
Hastings, George A.	105 East 22d St., New York City	1915
§‖Hatfield, Charles J., M. D.	2008 Walnut St., Philadelphia, Pa.	1913
Hattie, W. H., M. D.	Halifax, N. S.	1913
Hatton, Edward H.	151 Fifth St., La Salle, Ill.	1915
‡Hatton, Thomas C.	City Hall, Milwaukee, Wis.	1910
*Hauser, Stephen J.	1669 Cedar Ave., Cincinnati, Ohio	1914
Hawford, Peter O., M. D.	720 North Nevada Ave., Colorado Springs, Colo.	1915
Hayes, E. S., M. D.	603 Third Ave., Eau Claire, Wis.	1915
Hayes, Oscar, M. D.	Majestic Bldg., Denver, Colo.	1913
*Hayes, W. D.	State Health Board, Jacksonville, Fla.	1914
**†Hayhurst, Emery R., M. D.	State Health Board, Columbus, Ohio	1913
§Hayne, James A., M. D.	Palmetto Bldg., Columbia, S. C.	1911
‡Hazlehurst, George H.	Municipal Bldg., Chattanooga, Tenn.	1913
‡‖Hazlehurst, James N.	Municipal Bldg., Chattanooga, Tenn.	1912
*‡Hazen, Allen	Forty-second St. Bldg., New York City	1892
Heard, James D., M. D.	6101 Pennsylvania Ave., Pittsburgh, Pa.	1915
†§Heckard, M. D., M. D.	5416 Wayne Ave., Chicago, Ill.	1907
Hedges, B. Van D., M. D.	703 Natchung Ave., Plainfield, N. J.	1907
Heffron, John L., A. M., M. D., Sc.D.	1014 James St., Syracuse, N. Y.	1915

*Heinemann, P. G., M. D.	Univ. of Chicago, Chicago, Ill.	1906
Heiser, Victor G., M. D.	61 Broadway, New York City	1913
Hektoen, Ludvig, M. D.	637 South Wood St., Chicago, Ill.	1915
Henderson, Andrew, M. D.	Powell River, Vancouver, B. C.	1915
Henry, C. P., M. D.	846 Center Ave., Reading, Pa.	1914
Henson, Graham E.	St. James Bldg., Jacksonville, Fla.	1914
†Herbert, Thomas G.	1906 Sixteenth St., Altoona, Pa.	1909
‡Hering, Rudolph G.	170 Broadway, New York City	1878
*Herms, William B.	1424 Le Roy Ave., Berkeley, Cal.	1912
Herndon, R. F., M. D.	727 Kress Bldg., Houston, Tex.	1916
Herring, Robert A., M. D.	U. S. Marine Hospital, Louisville, Ky.	1915
*Hess, Alfred F., M. D.	Box 262, Elberon, N. J.	1913
‖Hibbard, Miss Mary E.	Linea 49 Vedado, Havana, Cuba	1912
Hickman, W. W., M. D.	Noxapater, Miss.	1916
*Hidy, Klore William, M. D.	231½ South Vermont Ave., Los Angeles, Cal.	1913
‡Higgins, Lafayette	1144 West 25th St., Des Moines, Iowa	1913
‡Hill, G. Everett	156 Fifth Ave., New York City	1897
*Hill, Herbert M., M. D.	20 West Eagle St., Buffalo, N. Y.	1914
*†‡Hill, Hibbert W., M. D.	Institute of Public Health, London, Ont.	1896
Hill, James Sutcliffe, M. D.	Main St., Bellows Falls, Vt.	1916
Hill, Prof. John Edw.	Brown University, Providence, R. I.	1902
Hill, John W.	First Nat. Bank Bldg., Cincinnati, Ohio	1896
*‡Hill, Nicolas S., Jr.	100 William St., New York City	1910
*Hilliard, Prof. C. M.	87 Middle St., Braintree, Mass.	1911
Hindman, S. S., M. D.	St. Vincent's Hospital, Toledo, Ohio	1913
Hinds, M. E.	State Food and Drugs Lab., Nashville, Tenn.	1914
Hiscock, Ira V.	32 Brainerd Ave., Middletown, Conn.	1915
Hitchcock, John S., M. D.	160 Main St., Northampton, Mass.	1915
Hitchens, A. Parker, M. D.	Glenolden, Pa.	1907
Hixon, Miss Jessie M.	104 Livingston St., Brooklyn, N. Y.	1915
‡Hoad, Prof. William C.	328 East Huron St., Ann Arbor, Mich.	1913
Hochstadter, Irving	227 Front St., New York City	1915
‡§Hoffman, Frederick L.	761 Broad St., Newark, N. J.	1907
‡Hoffman, J. D.	Station A, Lincoln, Neb.	1912
Hoffman, Geo. L., Ph.D.	321 Fourth St., Logansport, Ind.	1915
Holcombe, Frank M., M. D.	Main St., Keeseville, N. Y.	1915
*‖Holden, G. W., M. D.	Agnes Memorial Sanatorium, Denver, Colo.	1913
Holdredge, Leigh I.	66 West 9th St., New York City	1915
Hollis, Lawrence W., M. D.	10th and Chestnut Sts., Abilene, Tex.	1916
*Holm, Marinus L., M. D.	913 Allegan St., Lansing, Mich.	1908
Holmes, Christian R., M. D.	10 East 8th St., Cincinnati, Ohio	1916
*Holt, W. L., M. D.	Maplewood, N. J.	1914
Holte, Halvor, M. D.	Crookston, Minn.	1914
Holway, Alvah S., A. B., S. B.	218 West Ely St., Alliance, Ohio	1915
*‡Hommon, Harry B.	3d and Kilgour Sts., Cincinnati, Ohio	1910
Hood, Charles H.	494 Rutherford Ave., Boston, Mass.	1913
*Hoover, Charles P.	230 East 18th Ave., Columbus, Ohio	1910
Hopkins, Erasmus G.	Glen Allen, Va.	1914
Horan, C. F.	Box 86, Watertown, Mass.	1915
*‡Horowitz, Murray P.	9 Newbury St., Boston, Mass.	1914
Hortmann, Henry C., M. D.	519 Thirteenth St., Galveston, Tex.	1914

Horton, Soton	524 West 57th St., New York City	1915
*†‡Horton, Theodore	State Health Dept., Albany, N. Y.	1912
*Houghton, E. M., M. D.	130 Longfellow Ave., Detroit, Mich.	1911
Hiram House, The	2723 Orange Ave., Cleveland, Ohio	1915
‡Howard, Charles D.	State Laboratory of Hygiene, Concord, N. H.	1913
Howard, Norman J.	Filtration Plant Laboratory, Dept. of Health, City Hall, Toronto, Ont.	1912
Howd, Salmon G., M. D.	153 Main St., Winsted, Conn.	1916
Howe, William Augustus, M. D.	State Education Dept., Albany, N. Y.	1912
Howell, William O.	4310 Pine St., Philadelphia, Pa.	1915
Howk, Horace John, M. D.	Mt. McGregor, N. Y.	1915
Howland, C. A.	283 Hudson Ave., Albany, N. Y.	1914
*†Hoyt, R. N.	317 Ash St., Manchester, N. H.	1913
Hoxsie, B. K., Jr.	Sherwood, N. Y.	1915
Hubbard, Le Roy W., M. D.	137 Primrose Ave., Mt. Vernon, N. Y.	1914
Hubbell, Clarence W.	2334 Dime Bank Bldg., Detroit, Mich.	1915
*Huckle, Clarence	15 Todd Pl., North East, Washington, D. C.	1913
Hudson, Jessie B., M. D.	510 Wilson Bldg., Clinton, Iowa	1912
Huebsch, Leo A., M. D.	Hamburg, Pa.	1915
Hull, Howard L., M. D.	State Dept. of Health, Harrisburg, Pa.	1916
*Humphrey, Henry C.	17 Battery Pl., New York City	1912
Hunt, Ralph H., M. D.	29 Harrison St., East Orange, N. J.	1914
Hunter, Henry G.	619 New Birke Bldg., Montreal, Que.	1914
Hurd, Henry M., M. D.	1023 St. Paul St., Baltimore, Md.	1906
†‡§Hurty, J. N., M. D.	29 East 2d St., Indianapolis, Ind.	1896
†Hutchinson, Woods, M. D., Hotel Marseilles, 103d St. and Broadway, New York City		1912
Hutshing, Edwin E.	1013 Joshua Green Bldg., Seattle, Wash.	1914
‡Hyde, Prof. Chas. G.	Univ. of California, Berkeley, Cal.	1905
†Iglesias, Manual S., M. D.	Vera Cruz, Mex.	1900
Ihlder, John	704 Union Trust Bldg., Washington, D. C.	1915
Ingham, E. A.	Mass. Inst. Tech., Boston, Mass.	1914
International Health Commission	61 Broadway, New York City	1913
Irwin, Ralph E.	Penna. Dept. of Health, Harrisburg, Pa.	1914
Izlar, A. L., M. D.	Ocala, Fla.	1914
*‡Jackson, Daniel D.	Columbia University, 116th St., New York City	1899
Jackson, Elmer C., M. D.	622 Fourth Ave., Ashland, Wis.	1913
‡Jackson, J. Frederick	1174 Whitney Ave., Whitneyville, Conn.	1914
Jackson, James M., M. D.	1115 Ave. B, Miami, Fla.	1914
‖Jacobs, Philip P., Ph. D.	105 East 22d St., New York City	1912
†Jacobsen, Joaquin, M. D.	Monserrate 2 St., Havana, Cuba	1911
James, Walter B., M. D.	17 West 54th St., New York City	1915
Jameson, P. Richard	R. F. D., Highland Ave., Brighton, N. Y.	1915
Jamieson, Heber C.	Prov. Lab., Univ. of Alberta, Edmonton, Alta.	1916
*Jennings, Fred H.	1146 Boyd St., Watertown, N. Y.	1908
Jenkins, James, Jr.	69 Schermerhorn St., Brooklyn, N. Y.	1915
‡Jenkins, Hubert O.	750 Palo Alto Ave., Palo Alto, Cal.	1909
Jennings, Miss Annie B.	48 Park Ave., New York City	1915
Jepson, S. L., A. M., Sc.D., M. D.	Capitol Bldg., Charleston, W. Va.	1915
Jewell, Albert H.	445 East University Ave., Ann Arbor, Mich.	1916

JOHNSON, E. KINGSLAND	Fishkill, N. Y.	1915
†JOHNSON, FRED, M. D.	501½ Bellinger St., Eau Claire, Wis.	1914
*‡JOHNSON, GEORGE A.	150 Nassau St., New York City	1900
JOHNSON, MISS HELEN LOUISE	234 Paddock St., Watertown, N. Y.	1915
JOHNSON, MISS INGRID	1615 Foster Ave., Chicago, Ill.	1913
‡JOHNSON, GEORGE B., M. D.	407 East Grace St., Richmond, Va.	1909
JOLLES, WILLARD B., M. D.	Orchard Park, N. Y.	1915
JOLLEY, WILLIAM F., M. D.	Troupsburg, N. Y.	1915
JOLLS, WILLARD B., M. D.	Orchard Park, N. Y.	1915
JONE, HUGO	P. O. Box 37, Station A, Brooklyn, N. Y.	1915
JONES, C. HAMPSON, M. D.	2529 St. Paul St., Baltimore, Md.	1915
JONES, E. A., M. D.	Cambridge, Md.	1915
*JONES, F. G.	Care Ely Lilly & Co., Greenfield, Ind.	1914
*‡JONES, GRANVILLE R.	Johns Hopkins University, Baltimore, Md.	1909
*JONES, PROF. H. N.	730 Wescott St., Syracuse, N. Y.	1912
JONES, JAMES C., M. D.	Panama City, Fla.	1914
‡JONES, LYMAN A., M. D.	Swampscott, Mass.	1910
JONES, MYRON J.	1779 Middlehurst Rd., Cleveland, Ohio	1914
JONES, WILLIAM A., M. D.	142 Main St., Aurora, Ill.	1913
‡JONES, WILLIAM A., M. D.	513 Pillsbury Bldg., Minneapolis, Minn.	1910
*JORDAN, EDWIN O.	Univ. of Chicago, Chicago, Ill.	1899
JORDAN, G. A., M. D.	St. Louis, Mo.	1911
*‡JORDAN, HARRY E.	113 Monument Pl., Indianapolis, Ind.	1904
*†JORDAN, JAMES O.	1104 City Hall Annex, Boston, Mass.	1905
†JORDAN, THOMAS, M. D.	City Health Board, Boston, Mass.	1902
JOSLIN, ROYAL KNIGHT	129 Blackstone Blvd., Providence, R. I.	1916
†JURIST, B.	19 Park Pl., New York City	1904
‡KASTENHUBER, E. G., JR.	P. O. Box 362, Easton, Md.	1912
KAY, HARRY M., M. D.	827 University Ave., Madison, Wis.	1914
†§KEAN, JEFFERSON R., M. D.	1624 H St., North West, Washington, D. C.	1909
KEISTER, WM. S., M. D.	State Board of Health, Richmond, Va.	1915
KEITH, SIMEON C., JR.	138 Lancaster Pl., Brookline, Mass.	1912
KELLERMAN, KARL F.	Bureau Plant Industry, U. S. Dept. Agriculture, Washington, D. C.	1907
KELLERT, ELLIS, M. D.	Bender Hygienic Laboratory, Albany, N. Y.	1915
†§KELLEY, EUGENE R., M. D.	41 Egremont Rd., Boulevard Station, Boston, Mass.	1912
*†KELLEY, J. B., M. S.	City Board of Health, Detroit, Mich.	1915
KELLOGG, J. H., M. D.	Battle Creek, Mich.	1878
KELLEY, FRANK L., M. D.	2241 Parker St., Berkeley, Cal.	1916
KENASTON, H. R., M. D.	Bonesteel, S. D.	1913
KENDRICK, ARTHUR	23 Church St., Cambridge, Mass.	1912
†§KENNEDY, JOHN PAYSON, M. D.	City Hall, Atlanta, Ga.	1909
KENNEDY, STEPHEN, R. M.	Blount Bldg., Pensacola, Fla.	1914
KENTUCKY AGRICULTURAL EXPERIMENT STATION	Lexington, Ky.	1914
*KERR, JOHN WALTER, M. D.	410 Girard St., North West, Washington, D. C.	1909
KERRIHAN, SAMPLE B.	807 Gay St., Portsmouth, Ohio	1915
†KIDDER, F. THOMAS	State Health Board, Woodstock, Vt.	1907
†KIEFER, GUY L.	Detroit, Mich.	1907
KIESERLING, ROBERT H.	Gano Ave., Clifton, Cincinnati, Ohio	1915
†KILBOURNE, CHARLES H.	556 West 186th St., New York City	1912
KILMARTIN, THOMAS J., M. D.	City Hall, Waterbury, Conn.	1916

KILMER, FRED B.	147 College Ave., New Brunswick, N. J.	1906
‡KIMBALL, D. D.	15 West 38th St., New York City	1912
KING, MISS MYRTLE E.	401 Court House, Minneapolis, Minn.	1916
*†KING, W. E., M. D.	Research Dept., Parke Davis & Co., Detroit, Mich.	1910
‖KINGSLEY, SHERMAN C.	315 Plymouth Ct., Chicago, Ill.	1912
KINNAIRD, R. N.	833 West 15th St., Des Moines, Iowa	1915
*†KINYOUN, J. J., M. D.	1423 Clifton St., North West, Washington, D. C.	1902
KIRKWOOD, R. C., M. D.	Box 9, Sante Fe, N. M.	1915
§KIRSCHBAUM, WM. G.	New Bedford, Mass.	1915
KISTLER, J. M., M. D.	148 Highland Ave., Minneapolis, Minn.	1913
†‡KLEIN, ALVIN W., M. D.	65 West Putnam St., Greenwich, Conn.	1909
‡KLEIN, WM. I.	313 Interstate Bldg., Kansas City, Mo.	1914
*KLIGLER, ISRAEL J., M. D.	824 East 165th St., Bronx, N. Y.	1912
*KLOTZ, OSKAR, M. D.	Univ. of Pittsburgh, Pittsburgh, Pa.	1912
KNIGHT, I. W., M. D.	Somerton St., Philadelphia, Pa.	1916
KNIGHT, JOHN C.	Plant City, Fla.	1914
†KNOPF, S. A., M. D.	16 West 95th St., New York City	1906
*†KNOWLES, M. MORRIS	Bureau of Filtration, Pittsburgh, Pa.	1901
KNOWLTON, MILLARD, M. D.	78 North Clinton Ave., Trenton, N. J.	1915
‡KNOWLTON, W. T.	1632 South Van Ness Ave., Los Angeles, Cal.	1913
KNOX, S. B. P., M. D.	914 Anacapa St., Santa Barbara, Cal.	1892
**‡§KOBER, GEORGE M., M. D.	1819 Q St., North West, Washington, D. C.	1896
KOEHLER, G.	2750 North Kimball Ave., Chicago, Ill.	1915
**KONRAD, EDMUND C., M. D.	1900 West 25th St., Cleveland, Ohio	1915
§KOPF, EDWIN W.	1 Madison Ave., New York City	1913
KORNEMANN, H. A., M. D.	262 Fifteenth Ave., Newark, N. J.	1904
KRESS, DANIEL H., M. D.	5 Pine Ave., Takoma Park, Washington, D. C.	1915
KRUM, HARRY J.	1230 Union St., Allentown, Pa.	1916
KRUMWIEDE, CHARLES, JR., M. D.	15 Hobart St., Bronxville, N. Y.	1914
KURK, FRED W.	817 Rubel Ave., Louisville, Ky.	1913
KURTZ, H. T., M. D.	Highland Falls, N. Y.	1915
§KUSEL, GEORGE C., M. D.	1831–1833 Chestnut St., Philadelphia, Pa.	1913
†§LA CHAPELLE, E. P., M. D.	9 St. James St., Montreal, Que.	1887
LADD, E. F.	Agriculture College, Fargo, N. D.	1912
LADD, HENRY A., M. D.	14 Beach St., Burlington, Vt.	1914
‡LAFRENIERE, THEODORE J.	9 St. James St., Montreal, Que.	1912
§LAKEMAN, CURTIS E.	25 West 45th St., New York City	1914
†LAMBERT, EDW. ALLYN	1089 Broad St., Bridgeport, Conn.	1915
LAMBERT, HENRY F.	Batavia, N. Y.	1915
LA MONT, CHARLES A., M. D.	Canton, Ohio	1914
†‡LANDIS, JOHN H., M. D.	6 Crescent Pl., Cincinnati, Ohio	1910
LANE, C. GUY, M. D.	36 Pleasant St., Woburn, Mass.	1914
**LANAHAN, JOSEPH A., M. D.	161 Hamilton St., Albany, N. Y.	1915
LANCASTER, H. M.	Queen's Park, Toronto, Ont.	1915
LANE, FRANK B., M. D.	528 Main St., East Orange, N. J.	1915
LAPE, RUSHMORE, M. D.	203 West St., Fair Haven, Vt.	1916
LAPPIN, RICHARD CORCORAN	203 East Capitol St., Washington, D. C.	1912
LA RIEW, F. J., M. D.	City Health Board, Washington, D. C.	1914
*LARSON, ALFRED	Address unknown	1912
LATHAM, W. W.	Crockett, Tex.	1916
LATHROP, MISS JULIA C.	Children's Bureau, Washington, D. C.	1913

Lathrope, Thomas R.	Box 284, Shreveport, La.	1915
Latta, S. W., M. D.	233 South 4th St., Philadelphia, Pa.	1915
Laubaugh, Ernest E.	1122 East Jefferson St., Boise, Idaho	1914
‡Laughlin, Wm. R., M. D.	2201 Estes Ave., Chicago, Ill.	1913
Law, Edwin Augustus, M. D.	Address unknown	1914
Law, Robert, M. D.	190 Laurier Ave., East, Ottawa, Ont.	1915
Lawall, Charles H.	39 South 10th St., Philadelphia, Pa.	1914
Lea, Richard S.	820 New Birks Bldg., Montreal, Que.	1907
*Leake, James P., M. D.	Hygienic Laboratory, Washington, D. C.	1912
Leary, James H., M. D.	Rush, N. Y.	1915
†‡Leary, Montgomery E., M. D.	Iola Sanatorium, R. F. D. No. 2, Rochester, N. Y.	1910
†Leathers, Waller S., M. D.	State Health Director, University, Miss.	1910
Le Bosquet, Maurice	506 West 69th St., Chicago, Ill.	1910
*Lebredo, Maria, M. D.	San Jose 99 Altos, Havana, Cuba	1911
*Lederer, Arthur, M. D.	4123 Drexel Blvd., Chicago, Ill.	1908
Ledyard, Edgar M.	P. O. Box 1785, Salt Lake City, Utah	1915
Le Feber, John	130–140 Eighth St., Milwaukee, Wis.	1913
Leland, Roscoe G., M. D.	1545 Spruce Dr., Kalamazoo, Mich.	1913
Lemmer, G. E., M. D.	153 Main St., Danbury, Conn.	1916
L'Engle, E. M., M. D.	2756 St. Johns Ave., Jacksonville, Fla.	1914
Lennon, George T.	Haverhill, Mass.	1915
‡Le Prince, Joseph	1820 State St., New Orleans, La.	1912
§Leroy Y Cassa, G., M. D.	Calle 10 No. 14, Altos-Vedado, Havana, Cuba	1911
Levine, Prof. Max	Ames, Iowa	1914
Levy, Aaron G.	8417 Panola St., New Orleans, La.	1915
*†§Levy, E. C., M. D.	Richmond, Va.	1904
‖§Lewinski-Corwin, E. H., Ph. D.	17 West 43d St., New York City	1915
Lewis, Dwight M., M. D.	36 High St., New Haven, Conn.	1907
Lewis, F. Park, M. D.	454 Franklin St., Buffalo, N. Y.	1907
*Lewis, Malcolm	4 Claremont Pl., Montclair, N. J.	1914
*Lewis, Paul A., M. D.	238 Pine St., Philadelphia, Pa.	1910
§Lewis, Richard H., M. D.	Raleigh, N. C.	1892
Lewis, Prof. William E.	27 North 15th St., Allentown, Pa.	1916
Lewisohn, Adolph	61 Broadway, New York City	1915
Lichtenberg, H. F., A. C.	218 Riley St., Buffalo, N. Y.	1915
‡Light, Alvin Lucien, M. D.	Dayton, Ohio	1914
†Lindsay, Wm. Kinkade, M. D.	1005 K St., Sacramento, Cal.	1913
Linecum, Addison L.	Asst. State Health Officer, Galveston, Tex.	1915
Lipman, Jacob O., M. D.	Experiment Station, New Brunswick, N. J.	1910
Lipman, William Henry, M. D.	Care Swift & Co., Union Stock Yards, Chicago, Ill.	1915
*‖Lippincott, Leon S., M. D.	8 Noble St., Brunswick, Me.	1914
Lippitt, William F., M. D.	San Juan, P. R.	1915
Lippman, Marion H.	795 Sutter St., San Francisco, Cal.	1914
Lochridge, Elbert E.	Springfield, Mass.	1905
Locke, Elisabeth, R. N.	220 West 7th St., Cincinnati, Ohio	1916
Loeb, Benjamin W.	25 North 11th St., Reading, Pa.	1914
*Long, Alfred G., M. D.	111 Middlegate St., Winnipeg, Man.	1909
Long, Walter S.	1116 Mississippi St., Lawrence, Kan.	1915
*‡Longfellow, Robert C., M. D.	1611 Twenty-second St., Toledo, Ohio	1910
*†Longley, Francis F.	Forty-Second St. Bldg., New York City	1906
Looney, R. N., M. D.	Boshford Block, Prescott, Ariz.	1913
Lord, Mrs. Frederick T.	305 Beacon St., Boston, Mass.	1912

Lougee, Lester B., M. D.	Marcella, N. Y.	1915
†Lounsbury, Wm. C.	1518 Tower Ave., Superior, Wis.	1910
Lowe, D. B., M. D.	Dept. 38, B. F. Goodrich Co., Akron, Ohio	1915
Lowe, Wm. Herbert, D. V. S.	117 Trenton Ave., Paterson, N. J.	1906
Lowther, Burton	3121 Park Ave., Kansas City, Mo.	1914
Lucia, Mildred H., R. N.	Mt. Washington Sanatorium, Eau Claire, Wis.	1916
Ludlow, David H., M. D.	244 Spring Garden St., Easton, Pa.	1915
‡Ludlow, J. L.	State Health Board, Winston-Salem, N. C.	1903
Ludwig, Ernest	The Leader-News Bldg., Cleveland, Ohio	1915
Luening, Fred W.	663 Forty-ninth St., Milwaukee, Wis.	1914
Lummis, G. D., M. D.	501 South Main St., Middletown, Ohio	1916
*Lumsden, Leslie L., M. D.	Hygienic Laboratory, U. S. P. H. S. and M. H. S., Washington, D. C.	1909
†Luster, Robert D., M. D.	Granite City, Ill.	1914
*‡Lyall, Harold Wm., Ph. D.	Research Antitoxin Laboratory, Otisville, N. Y.	1910
Lyman, Francis R., M. D.	Broadway, Hastings on Hudson, N. Y.	1915
Lyster, Major Wm. John	Room 338, War Dept., Washington, D. C.	1913
††McBrayer, Supt. L. B., M. D.	State Tuberculosis Sanatorium, Sanatorium, N. C.	1914
McBride, J. S., M. D.	811 Thirty-Fifth Ave., Seattle, Wash.	1916
*McBryde, C. N.	Dept. of Agriculture, Washington, D. C.	1910
†McCaskey, Donald, M. D.	24 West 59th St., New York City	1914
McCaustland, E. J., Dean	School of Engineering, Univ. of Missouri, Columbia, Mo.	1914
McClenahan, Daniel A.	204 Herkimer St., Hamilton, Ont.	1912
McClintock, Charles T., M. D.	Asheville, N. C.	1908
McClintock, George	Overbrook, Kan.	1914
McCormick, L.	Asheville, N. C.	1915
McCrady, Mac H.	9 St. James St., Montreal, Que.	1915
††McCrudden, James F.	5914 Pulaski Ave., Germantown, Philadelphia, Pa.	1914
**McCurdy, Sidney, M. D.	Youngstown Sheet & Tube Co., Youngstown, Ohio	1915
McCuistion, Ed. H.	136 North 18th St., Paris, Tex.	1916
McCullough, John W. S., M. D.	Parliament Bldgs., Toronto, Ont.	1912
McDill, John R., M. D.	628 Astor St., Milwaukee, Wis.	1916
McDonald, J. Oliver, M. D.	190 West State St., Trenton, N. J.	1916
*McDonnell, Milton E., M. D.	2629 Broad Ave., Altoona, Pa.	1910
McDowell, John R.	City Bldg., Springfield, Ohio	1915
*McFarland, Joseph, M. D.	447 Stafford St., Germantown, Pa.	1897
McFarland, Orin S.	Tampa Water Works Co., Tampa, Fla.	1914
‡McGee, Harold	Corner Winthrop and Edwards Sts., Jackson, Mich.	1915
McGill, Anthony	317 Queen St., Ottawa, Ont.	1910
†McGill, Patrick G., M. D.	1202 Tower St., Superior, Wis.	1909
‖McGinnis, R. H., M. D.	501 Laura St., Jacksonville, Fla.	1914
§McGlenen, E. W.	100 Summer St., Boston, Mass.	1912
McGregor, Tracey W.	239 Brush St., Detroit, Mich.	1915
McGuire, Stuart, M. D.	513 East Grace St., Richmond, Va.	1909
McInerney, T. T.	Ithaca, N. Y.	1915
*McKay, W. G.	47 West 10th St., Jacksonville, Fla.	1911
McKee, Mark T.	937 Dime Bank Bldg., Detroit, Mich.	1915
‡McKenzie, T. H.	21 Berlin Ave., Southington, Conn.	1910
McKinlay, John F.	233 St. Antoine St., Detroit, Mich.	1915
McKinstry, James F., Jr., M. D.	205 West Main St., Gainesville, Fla.	1914
*McLaughlin, Allan J., M. D.	State Health Dept., Boston, Mass.	1912

*McLaughlin, George E., M. D.	41 Crescent Ave., Jersey City, N. J.	1901
McLean, Ephraim R., M. D.	Cleveland, Miss.	1916
‖McLean, F. H.	130 East 22d St., New York City	1912
McLellan, E. A., M. D.	105 Park St., Bridgeport, Conn.	1916
McNair, J. C., M. D.	Fayette, Miss.	1916
McNally, Thomas J., M. D.	22 Oxford St., Guelph, Ont.	1912
McNeil, Archibald, M. D.	85 Rockledge Ave., White Plains, N. Y.	1914
*‡McRae, Henry C.	3413 Piedmont Ave., Baltimore, Md.	1907
†McShane, John J., M. D.	169 English Ct., Kenosha, Wis.	1915
McSweeney, Edw. F.	40 Central St., Boston, Mass.	1915
Mac Diarmid, John	2½ South Blvd., Deland, Fla.	1915
MacDonald, Miss Pearl	State College, Pa.	1915
MacKenzie, Prof. C. J.	Care Univ. of Saskatchewan, Saskatoon, Sask.	1915
MacKnight, Adam S., M. D.	355 North Main St., Fall River, Mass.	1915
*†MacNutt, J. Scott	38 Westland Ave., Boston, Mass.	1910
Mahoney, Francis X., M. D.	701 Columbia Rd., Boston, Mass.	1912
Mahoney, John Joseph, M. D.	401 Lafayette St., Jamestown, N. Y.	1915
Malaret, Pedro, M. D.	Box 66, Ponce, P. R.	1915
Mallalieu, Willard C.	494 Bergen Ave., Jersey City, N. J.	1916
Maloney, Paul J., M. D.	Cornwall, Ont.	1912
Maloney, J. B., M. D.	Key West, Fla.	1915
Manchester, Hiram L., M. D.	Pawlet, Vt.	1916
Manheimer, W. A., Ph. D.	565 West 139th St., New York City	1914
Mann, Frank H.	105 East 22d St., New York City	1915
**Mann, Kristine, A. M., M. D.	251 West 100th St., New York City	1915
Manning, Wm. J., M. D.	1113 N St., North West, Washington, D. C.	1909
Marcley, Walter J., M. D.	Walker, Minn.	1904
*Marcussen, Wm. H.	Nichols, N. Y.	1913
*‡Mark, Prof. Edgar N.	State Sanitary Engineer, Bowling Green, Ky.	1912
**Mark, Miss Mary Louise	270 South State St., Westerville, Ohio	1915
‖Marks, Miss Jeanette	The President's House, South Hadley, Mass.	1914
Marsh, Wm. Henry, M. D.	P. O. Box 75, Solomons, Md.	1915
*Marshall, Charles E.	44 Sunset Ave., Amherst, Mass.	1901
Martinez, Emilio, M. D.	Neptune 56, Havana, Cuba	1911
Maslon, Morris, M. D.	3 Lincoln Ave., Glen Falls, N. Y.	1915
Mason, E. Marvin, M. D.	1308–1314 Jefferson Co. Bank Bldg., Birmingham, Ala.	1913
*Mason, William P.	Troy, N. Y.	1905
Mather, Samuel	Address unknown	
Mathers, John M.	103 East Pine St., Goldsboro, N. C.	1914
Matson, E. G.	431 Sixth Ave., Pittsburgh, Pa.	1911
Matthews, L. A.	66 North Willow St., Montclair, N. J.	1915
†Mattison, Fitch C. E.	City Chamber of Commerce, Pasadena, Cal.	1910
Mead, Daniel W.	530 State St., Madison, Wis.	1892
*Meader, Fred Marlin, M. D.	State Health Dept., Albany, N. Y.	1912
Meader, Percy D.	Arnold Laboratory, Brown University, Providence, R. I.	1915
Mears, E. N. K., M. D.	48 Brattle St., Cambridge, Mass.	1915
Mears, J. Ewing, M. D.	1535 Land Title Bldg., Philadelphia, Pa.	1905
Subscription to J. E. Mears Library Foundation, Trinity College, Hartford, Conn.		
‡Mebus, C. F.	908 Land Title Bldg., Philadelphia, Pa.	1912
Meeker, Royal	Bureau of Labor Statistics, Washington, D. C.	1911
†Melvin, Alonzo D.	1751 Park Rd., Washington, D. C.	1910
Mendez, Arturo, M. D.	San Luis Potosi, Mex.	1906

MENGE, G. A.	Bureau of Animal Industry, Washington, D. C.	1912
††MERCUR, WILLIAM HENRY, M. D.	5th Ave. and St. James St., Pittsburgh, Pa.	1912
MERRILL, THEODORE C., PH. B., M. D.	1744 Columbia Rd., Washington, D. C.	1916
‡MESSER, RICHARD	1110 Capitol St., Richmond, Va.	1911
METROPOLITAN LIFE INSURANCE COMPANY	1 Madison Ave., New York City	1915
MICHIGAN STATE HEALTH BOARD, SECRETARY	Lansing, Mich.	1915
*MICKLE, F. LEE	State Water Survey, Urbana, Ill.	1914
MILES, R. E.	Hartman Bldg., Columbus, Ohio	1912
MILLER, L. A., M. D.	418 Colorado Ave., Colorado City, Colo.	1913
*MILLER, EDGAR C. L., M. D.	Care Med. Coll. of Virginia, Richmond, Va.	1908
†MILLER, OLIVER J., M. D.	Peoples Bank Bldg., Sanford, Fla.	1914
MILLS, WM. WIRT	249 Manor Rd., West New Brighton, N. Y.	1910
MITCHEL, E. W.	P. O. Box 376, Ancon, C. Z.	1915
MITCHELL, HENRY, M. D.	421 Meadowbrook Rd., Wayne, Pa.	1886
*‡MITCHELL, JOHN P.	Stanford University, Cal.	1909
*MOAT, C. P.	State Health Board, Burlington, Vt.	1903
**MOCK, HARRY E., M. D.	7409 Sheridan Rd., Chicago, Ill.	1915
MOHLER, JOHN R.	1620 Hobart St., North West, Washington, D. C.	1914
MOHR, CHARLES A., M. D.	252 St. Anthony St., Mobile, Ala.	1915
MOLLOY, DANIEL M., M. D.	Address unknown	1914
†MOLLOY, WILLIAM J., M. D.	310 South Mulberry St., Muncie, Ind.	1913
MONCRIEFF, JOHN T., M. D.	1250 Broad St., Columbus, Ga.	1913
MONFORT, WILSON F.	506 North Vandeventer Ave., St. Louis, Mo.	1908
*†§MONJARAS, JESUS E., M. D.	Calle de Ezequiel, Montes No. 15, Mexico City, Mex.	1891
MONTILLA, F.	Ayuntamiento Bldg., San Juan, P. R.	1915
MOUQUIN, LOUIS H. F.	273 West End Ave., New York City	1916
MOOR, FREDERICK C.	Telephone Bldg., Tallahassee, Fla.	1914
MOORE, CARROLL A.	Bellows Falls, Vt.	1904
†MOORE, JOHN A., M. D.	Main St. and Park Ave., Millerton, N. Y.	1914
MOORE, MRS. PHILIP N.	3125 Lafayette Ave., St. Louis, Mo.	1915
§MOORE, T. V., M. D.	Lewisohn Bldg., Butte, Mont.	1915
*MOORE, V. A., M. D.	Veterinary College, Ithaca, N. Y.	1896
MOREE, E. A.	14 Prospect Dr., Yonkers, N. Y.	1914
MOREY, GEORGE C., M. D.	Remsen, N. Y.	1915
MORGAN, H. G., M. D.	Third Floor, City Hall, Indianapolis, Ind.	1913
MORGAN, JOHN W., M. D.	85 South Penn St., Denver, Colo.	1913
MORRIS, MISS AGNES	New Court Bldg., New Orleans, La.	1916
MORRIS, S. POULTER	State Capitol, Denver, Colo.	1912
MORSE, ROBERT B.	16 West Saratoga St., Baltimore, Md.	1915
‡MORSE, COL. W. F.	90 West St., New York City	1912
MOSHER, ELIZA M., M. D.	Galen Hall, Brooklyn, N. Y.	1889
††MOTT, WM. E.	842 Sheridan Ave., Pittsburgh, Pa.	1910
MUDGE, COURTLAND S.	32 Mt. Vernon St., Providence, R. I.	1913
*MULCAHEY, JOHN V.	17 Eastfield Ave., Trenton, N. J.	1907
MULDOWNEY, MISS MARY M.	363 Quail St., Albany, N. Y.	1915
MULFORD, H. K.	412 South 13th St., Philadelphia, Pa.	1896
**MULL, EDGAR P.	Care Allen Filter Co., Toledo, Ohio	1910
MULLIN, R. H., M. D.	Univ. of Nevada, Reno, Nev.	1911
MULLOWNEY, JOHN J., M. D.	State Health Board, Harrisburg, Pa.	1913
MUNFORD, SAMUEL A., M. D.	317 College Ave., Ithaca, N. Y.	1915
MURPHEY, EUGENE EDMUND, M. D.	452 Telfair St., Augusta, Ga.	1914

†Murphy, Anthony M., M. D. ..... City Hall, La Crosse, Wis. 1910
Murphy, Ignatius J. ..... Minn. Public Health Assn., St. Paul, Minn. 1914
Murphy, John M., M. D. ..... 1956 Jackson Blvd., Chicago, Ill. 1914
*Murphy, Lyman C. ..... Address unknown 1913
Murray, Joseph I. ..... Crescent Creamery Co., Winnipeg, Man. 1915
‡Murray, T. Aird ..... 186 King St., West, Toronto, Ont. 1915
Murray, Prof. T. J. ..... Agricultural Experiment Station, Blacksburg, Va. 1916
Musgrave, William E., M. D. ..... Philippine General Hospital, Manila, P. I. 1915

Nagle, John T., M. D. ..... 2 East 127th St., New York City 1874
||Nasbitt, Chas. T., M. D. ..... 415 South Front St., Wilmington, Del. 1913
National Organization for Public Health Nursing ..... 54 East 34th St., New York City 1913
Naulty, Charles W., Jr., M. D. ..... U. S. Quarantine, Perth Amboy, N. J. 1915
†§Neff, Joseph S., M. D. ..... Narberth, Pa. 1897
§Neill, Mather H., M. D. ..... Hygienic Laboratory, Washington, D. C. 1915
||Nelbach, George J. ..... 105 East 22d St., New York City 1912
Nelson, N. A. ..... Long Branch, N. J. 1915
Nevin, Miss Mary ..... State Laboratory, Dept. of Health, Albany, N. Y. 1915
New Jersey State Health Board ..... Trenton, N. J. 1915
New Rochelle Dept. of Health ..... New Rochelle, N. Y. 1915
*Newell, Clyde R. ..... 905 West Illinois St., Urbana, Ill. 1914
*‡Newlands, James A. ..... 11 Laurel St., Hartford, Conn. 1907
Newman, G. A., M. D. ..... Care Prison Hospital, Stillwater, Minn. 1899
Nichols, John D. ..... 7100 Clark Ave., Cleveland, Ohio 1914
Nichols, M. Starr ..... 1015 University Ave., Madison, Wis. 1916
Nichols, Nelson E., M. D. ..... 657 Congress St., Portland, Me. 1911
Nickerson, J. F. ..... 431 South Dearborn St., Chicago, Ill. 1912
‡Nicol, Norman C. ..... 17 Gramercy Park, New York City 1913
Nisbet, Verner, M. D. ..... Marietta, Pa. 1915
Noble, Robt. E., Major M. C. ..... U. S. Army, War Department, Washington, D. C. 1915
†||Noland, Lloyd, M. D. ..... 1404 Brown Marx Bldg., Birmingham, Ala. 1913
*Nolte, August G. ..... 2253 Athlone Ave., St. Louis, Mo. 1914
*†North, Charles E., M. D. ..... 30 Church St., New York City 1908
Norton, Arthur C., M. D., H. O. ..... Middletown Springs, Vt. 1916
‡Norton, George H., M. D. ..... 7 Municipal Bldg., Buffalo, N. Y. 1913
*Norton, John F., Ph. D. ..... Mass. Inst. Tech., Boston, Mass. 1912
Noxon, G. H., M. D. ..... Main and Gracious Sts., Darien, Conn. 1916
‡Nuebling, Emil L. ..... 25 North 11th St., Reading, Pa. 1912

Oakman, Carl S., M. D. ..... 22 Locust St., Detroit, Mich. 1914
Ober, Geo. Eugene, M. D. ..... 632 Kossuth St., Bridgeport, Conn. 1916
Obert, B. H. ..... 709 Asbury Ave., Asbury Park, N. J. 1914
O'Brien, Henry R. ..... 532 Packard St., Ann Arbor, Mich. 1914
Obst, Mrs. Maud Mason ..... Bureau of Chemistry, Washington, D. C. 1915
‡||Ogden, Prof. H. N. ..... 614 University Ave., Ithaca, N. Y. 1912
Ohage, Justus, M. D. ..... 5th and Cedar Sts., St. Paul, Minn. 1915
Ohio State Board of Health ..... Columbus, Ohio 1911
O'Maley, J. M., M. D. ..... Pike and Main St., Covington, Ky. 1916
O'Mara, Miss Ella Anna ..... 313 Abercorn St., Savannah, Ga. 1914
*‡O'Neill, John H. ..... 936 Aribella St., New Orleans, La. 1914
‡||Orenstein, A. J., M. D. ..... P. O. Box 1056, Johannesburg, South Africa 1912

Osborn, Miss Alice C.	Address unknown	1915
Osborn, Stanley H., M. D.	61 Elmwood Ave., North Adams, Mass.	1914
‖Osborne, Frank J.	City Hall, Orange, N. J.	1913
Ostheimer, Maurice, M. D.	2202 De Lancey Pl., Philadelphia, Pa.	1915
Otis, Edward O., M. D.	381 Beacon St., Boston, Mass.	1894
Overton, Frank, M. D.	Patchogue, N. Y.	1912
‖Owen, Edward B., M. D.	402 West Main St., Merrill, Wis.	1913
Owen, Wm. O., M. D.	2719 Ontario Rd., Washington, D. C.	1910
Owens, Robert B.	Edmonton, Alta.	1908
Page, B. W., M. D.	Court House, Lumberton, N. C.	1915
Pagé, J. D., M. D.	P. O. Sans Bruit, Quebec, Que.	1915
*Page, Calvin G., M. D.	128 Marlborough St., Boston, Mass.	1914
Paine, Liston, M. D.	Hygienic Laboratory, Washington, D. C.	1915
**Palmer, George T.	40 St. Nicholas Pl., New York City	1911
Park, Emory R., M. D.	State Capitol Bldg., Atlanta, Ga.	1914
†Park, William E., M. D.	1246 East State St., Rockford, Ill.	1912
*Park, William H., M. D.	315 West 76th St., New York City	1899
Parker, Henry F., M. D.	9 Village Ave., Rockville Centre, N. Y.	1915
*Parker, Francis Le Jau, M. D.	40 Broad St., Charleston, S. C.	1914
*Parker, Horatio N.	Technology Chambers, Irvington St., Boston, Mass.	1900
Parnall, Christopher G., M. D.	Municipal Bldg., Jackson, Mich.	1915
Parramore, James B., M. D.	341-342 St. James Bldg., Jacksonville, Fla.	1915
Parry, Eleanor, M. D.	749 Madison Ave., New York City	1901
Parsons, Payn B.	641 Washington St., New York City	1915
**Parsons, Robert	215 West 23d St., New York City	1915
Pastene, Albert A., M. D.	Box 32, Chester, Mont.	1916
Patchin, Charles V., M. D.	66 Elizabeth St., Dansville, N. Y.	1915
Patten, Miss Jane B.	Elm Brook, South Natick, Mass.	1914
Patterson, Francis D., M. D.	2103 Locust St., Philadelphia, Pa.	1913
Paul, George P., M. D.	187 St. Botolph St., Boston, Mass.	1915
‡Paxton, James W.	327 Municipal Bldg., Washington, D. C.	1912
‡Pearse, M. Langdon	5435 East End Bldg., Chicago, Ill.	1910
‡Pease, H. D., M. D.	39 West 38th St., New York City	1897
Peebles, A. R.	1600 Hillside Rd., Boulder, Colo.	1914
Pendleton, Miss Helen B.	City Hall, Savannah, Ga.	1914
*Perkins, Roger G., M. D.	R. F. D. 105 A, Wakefield, R. I.	1902
†Perrow, Mosby G.	1100 Federal St., Lynchburg, Va.	1908
‖§Perry, Arthur R., M. D.	U. S. Dept. of Labor, Washington, D. C.	1913
Perry, Frank, M. D.	Main and Maple Sts., Norwood, Ohio	1916
Perry, F. C., M. D.	210 Laura St., Jacksonville, Fla.	1914
Perry, J. C., M. D.	U. S. P. H. Service, Ellis Island, N. Y.	1903
Peters, Arthur O., M. D.	705 Reibold Bldg., Dayton, Ohio	1915
Peters, William H.	3169 Vine St., Cincinnati, Ohio	1913
§Petrie, William F.	1025 Ionia St., West, Lansing, Mich.	1914
*‡Phelps, Earle B., M. D., Hygienic Laboratory, U. S. P. H. Service, Washington, D. C.		1902
*Philbrick, Burton G.	18 Ocean Ave., Salem, Mass.	1908
Philippine Health Service	Manila, P. I.	1915
‡Phillips, Asa Emory	1458 Belmont St., Washington, D. C.	1912
Pickel, Oscar C.	Box 919-920, Antofagasta, Chili	1913
†Pickett, Wm. H.	City Health Office, Gainesville, Fla.	1914
Pillans, P. P., M. D.	City Health Officer, Orlando, Fla.	1914

PINCUS, SOL	Hygienic Laboratory, Washington, D. C.	1916
†‖PLATT, PHILIP S.	105 East 22d St., New York City	1914
§PLEADWELL, FRANK L., M. D.	Navy Department, Washington, D. C.	1909
§PLECKER, WALTER A., M. D.	1110 Capitol St., Richmond, Va.	1914
**PLUMMER, CHARLES G., M. D.	465 East South Temple St., Salt Lake City, Utah	1915
†POLING, J. A., M. D.	Old Colony Bldg., Freeport, Ill.	1911
*POMEROY, C. T.	9 Nowell Rd., Melrose Highlands, Mass.	1911
POMEROY, J. L., M. D.	Hall of Records, Los Angeles, Cal.	1915
POOR, DANIEL W.	27 Ridge St., Orange, N. J.	1915
PORTER, F. B., M. D.	P. O. Box 1008, Fort Worth, Tex.	1912
PORTER, GEORGE D., M. D.	162 Crescent Rd., Toronto, Ont.	1915
*PORTER, JOHN L., M. D.	840 Panola St., New Orleans, La.	1902
PORTER, JOSEPH Y., M. D.	State Health Officer, Jacksonville, Fla.	1878
*§PORTER, JOSEPH Y., JR., M. D.	Key West, Fla.	1911
†PORTER, S. D., M. D.	Box 18, R. F. D. No. 2, Baton Rouge, La.	1911
PORVIN, EDWARD C., M. D.	301 East Fordham Rd., New York City	1914
POTTENGER, FRANCIS M., M. D.	Monrovia, Cal.	1911
POTTER, ALEXANDER	50 Church St., New York City	1914
‡POTTS, CLYDE	30 Church St., New York City	1907
POUCHER, FRANK C.	1 Madison Ave., New York City	1913
POWELL, ROBERT C.	1301 North Charles St., Baltimore, Md.	1915
§POWELL, THOMAS, M. D.	415 Columbia Trust Bldg., 313 West 3d St., Los Angeles, Cal.	1909
POWERS, LUTHER MILTON, M. D.	1022 North Alvarado St., Los Angeles, Cal.	1913
*PRATT, GILBERT H.	Box 37, Jersey City, N. J.	1905
‖PRENTISS, MRS. S. R.	31 Kenduskeag Ave., Bangor, Me.	1912
*‡PRESCOTT, PROF. SAMUEL C.	585 Boylston St., Boston, Mass.	1902
**PREST, CHARLES S., M. D.	54 Third St., Waterford, N. Y.	1912
**‖PRICE, GEORGE M., M. D.	31 Union Sq., New York City	1912
PRICE, WILLIAM H., M. D.	City Health Board, Detroit, Mich.	1913
PROCTOR, REDFIELD	Proctor, Vt.	1914
‡PROVOST, ANDREW J., JR.	39 West 38th St., New York City	1910
PRUCHA, MARTIN J.	Univ. of Illinois, Urbana, Ill.	1915
*PRUDDEN, T. MITCHELL, M. D.	160 West 59th St., New York City	1904
PRYER, ROY W.	Detroit Board of Health, Detroit, Mich.	1916
PURDY, C. H.	Aragon Hotel, Jacksonville, Fla.	1914
PUTNAM, MRS. WM. LOWELL	49 Beacon St., Boston, Mass.	1915
QUIMBY, E. FREDERICK	Gatun, C. Z.	1913
QUIMBY, ROBERT STANLEY, M. D.	361 School St., Watertown, Mass.	1916
‡QUINN, MISS MARTHA P.	612 Fidelity Bldg., Philadelphia, Pa.	1912
QUESSY, A. H., M. D.	Fitchburg, Mass.	1915
*‖RACE, JOSEPH	Ottawa, Ont.	1912
*RAHN, PROF. OTTO	1111 West Stoughton St., Urbana, Ill.	1914
*‖RAMALEY, PROF. FRANCIS	Univ. of Colorado, Boulder, Colo.	1913
**RAND, W. H., M. D.	1440 Clifton St., Washington, D. C.	1915
RANDOLPH, MISS AGNES D.	1110 Capitol St., Richmond, Va.	1914
RANH, SIDNEY J., D. D. S.	54 Harrison Bldg., Cincinnati, Ohio	1916
†RANKIN, WATSON S., M. D.	5 West Hargett St., Raleigh, N. C.	1909
§RAUNICK, JOHN M. J., M. D.	212 Hamilton St., Harrisburg, Pa.	1915
*RAVENEL, M. P., M. D.	Univ. of Missouri, Columbia, Mo.	1897
RAVER, CARL F., M. D.	503 Lawrence St., Ann Arbor, Mich.	1914

†Rawlings, I. D., M. D.	1439 Sherwin Ave., Rogers Park Sta., Chicago, Ill.	1909
†Raycroft, Prof. Joseph Edw.	Princeton University, Princeton, N. J.	1914
*Rector, Frank L., M. D.	36 Forty-first St., Brooklyn, N. Y.	1909
Redmond, Francis J., M. D.	Fillmore, N. Y.	1915
Reede, Edward H., M. D.	The Rochambeau, Washington, D. C.	1915
Register, Edward C., M. D.	Charlotte, N. C.	1914
*Reichel, John, M. D.	Glenolden, Pa.	1907
‡Reid, Herbert I.	505 North Webber St., Colorado Springs, Colo.	1913
Reilly, Walter A., A. M., M. D.	172 Meadow St., Naugatuck, Conn.	1916
Reinoehl, John Krause	Address unknown	1913
Rettger, Prof. Leo F.	Sheffield Scientific School, New Haven, Conn.	1915
*†Revell, D. G.	Edmonton, Alta.	1907
*Rex, Clarence P.	201 National Union Bldg., Toledo, Ohio	1912
Rhame, Wm., M. D.	Wautagh Ave., Wautagh, N. Y.	1915
*‡Rhynus, C. P.	Hygienic Laboratory, Washington, D. C.	1914
‡Rich, Edward D.	621 Oakland Bldg., Lansing, Mich.	1913
Richards, Edgar	60 Ayrault St., Newport, R. I.	1889
†Richards, Louis J.	City Hall, Elizabeth, N. J.	1909
**Richardson, Miss Anna M.	140 Mountain Ave., Summit, N. J.	1915
*§Richardson, Mark W., M. D.	23 Equitable Bldg., Boston, Mass.	1909
Richmond, W. D., A. B., A. M., M. D.	209–211 Empire Bldg., Knoxville, Tenn.	1914
*†‡Rickards, Burt R.	34 Poplar St., Melrose, Mass.	1901
†Ritchie, John, Jr.	Mass. Inst. Tech., Boston, Mass.	1912
§Ritchie, Prof. J. W.	54 Saratoga Ave., Yonkers, N. Y.	1914
Rittenhouse, Elmer E.	25 West 45th St., New York City	1915
Rivero, Filiberto, M. D.	127 Reina St., Havana, Cuba	1915
Rives, William C., M. D.	1702 Rhode Island Ave., Washington, D. C.	1885
Roach, Walter W., M. D.	2905 Columbia Ave., Philadelphia, Pa.	1915
Roberg, David N., M. D., D. T. M.	1012 Selling Bldg., Portland, Ore.	1916
†Roberts, C. F., M. D.	250 West 72d St., New York City	1892
†Roberts, James, M. D.	City Hall, Hamilton, Ont.	1907
Robertson, John Dill, M. D.	City Hall, Chicago, Ill.	1915
*Robin, Albert, M. D.	1202 Delaware Ave., Wilmington, Del.	1899
Robinson, Dana E., M. D.	Ellis Island, New York City	1916
*Robinson, George L.	39 East 28th St., New York City	1913
Robinson, James Ernest, M. D.	Temple State Bank Bldg., Temple, Tex.	1912
Robison, John A., M. D.	30 North Michigan Blvd., Chicago, Ill.	1914
Rochester Health Bureau	Rochester, N. Y.	1915
Rockhill, C. S., M. D.	909 Union Central Bldg., Cincinnati, Ohio	1914
Rockwell, Alvin H., M. D.	510 South Burdick St., Kalamazoo, Mich.	1913
Roddy, John A., M. D.	1604 Pine St., Philadelphia, Pa.	1914
*Rogers, Lore A.	3735 Oliver St., Washington, D. C.	1913
Roscoe, H. L.	Sweet Springs Creamery, 2d and Vermont Sts., Sedalia, Mo.	1915
Rose, Lorenzo O., M. D.	Parkersburg, W. Va.	1907
*Rosenau, J. Milton, M. D.	82 Stedman St., Brookline, Mass.	1909
Rosenberger, Randle C., M. D.	Jefferson Medical College, Philadelphia, Pa.	1915
Ross, Luther S.	1308 Twenty-seventh St., Des Moines, Iowa	1915
Rosser, Henry N., M. D.	Court House, Birmingham, Ala.	1915
*Round, L. A.	Bureau of Chemistry, Washington, D. C.	1911
‖Routzahn, E. G.	130 East 22d St., New York City	1912
†Royer, B. Franklin, M. D.	331 Donaldson Aptms., Harrisburg, Pa.	1907
Rubinow, I. M., M. D., Ph. D.	131 East 23d St., New York City	1916

*Rucker, James B., Jr., M. D.	State Health Laboratories, Philadelphia, Pa.	1911
Rucker, W.	U. S. P. H. and M. H. Service, Washington, D. C.	1910
†Ruediger, Gustav F., M. D.	General Delivery, La Salle, Ill.	1908
*Ruehle, G. L.	N. Y. Agricultural Experiment Station, Geneva, N. Y.	1914
*Ruhland, George C., M. D.	City Health Dept., Milwaukee, Wis.	1914
Runcie, W. H., M. D.	103 West Merrick Rd., Feufort, N. Y.	1915
**‡Rush, Prof. J. E.	Carnegie Inst. Tech., Pittsburgh, Pa.	1914
Ruttan, Henry	City Hall, Winnipeg, Man.	1908
Ryan, John N., M. D.	158 Lexington Ave., Passaic, N. J.	1915
Ryland, C. T., M. D.	1922 Main St., Lexington, Mo.	1916
Sabey, Welton B., M. D.	Ravena, N. Y.	1915
Sadtler, Samuel S.	210 South 13th St., Philadelphia, Pa.	1915
**Safford, Victor, M. D.	U. S. Immigration Station, Boston, Mass.	1915
*Salmonde, H. F., M. D.	West Parish Filters, Westfield, Mass.	1910
Samper, B., M. D.	P. O. Box 77, Bogota, Columbia, South America	1916
*‡Sanborn, Morton F.	30 Ten Eyck Ave., Albany, N. Y.	1914
†‡Sanders, W. H.	Capitol, Montgomery, Ala.	1912
*Sandman, E. A.	Relay, Md.	1912
Sanguinet, Miss Josephine	Address unknown	1914
‡Sappington, Harry O., M. D.	Galveston, Tex.	1914
Sautter, Arthur, M. D.	220 State St., Albany, N. Y.	1915
‡Saville, Charles	Director of Sanitation, Dallas, Tex.	1913
*Sawin, Luther Robinson, M. D.	Mt. Kisco, N. Y.	1904
Sawyer, F. L.	Queen City Dairy Co., Buffalo, N. Y.	1914
*Sawyer, W. A., M. D.	3123 T St., Sacramento, Cal.	1910
Sayler, Harley L., M. D.	1019 East 6th St., Des Moines, Iowa	1913
Schaefer, A. C., M. D.	753 Michigan Ave., Buffalo, N. Y.	1912
Scheller, Miss Helen M.	Little Rapids, Wis.	1916
Schenk, P. S., M. D.	17 Raleigh Ave., Norfolk, Va.	1911
Schier, O. B.	3701 Vernon Ave., Baltimore, Md.	1914
Schmid, Henry E., M. D.	White Plains, N. Y.	1913
Schmidt, Samuel M.	21 Chambers St., Boston, Mass.	1916
*Schneider, Prof. Edward C.	218 East Uintah St., Colorado Springs, Colo.	1913
*Schneider, Franz, Jr.	130 East 22d St., New York City	1908
Schoonover, Warren, M. D.	115 East 59th St., New York City	1895
*Schorer, Edwin H., M. D.	1010 Rialto Bldg., Kansas City, Mo.	1907
*Schroeder, May C., M. D., Research Laboratories, Foot of E. 16th St., New York City		1912
Schuyler, Miss Louise Lee	Highland Falls, N. Y.	1915
Schwartz, Edward J., M. D.	93 East Main St., Salem, Ohio	1916
*Schwartz, Frederick W.	439 Hamilton St., Albany, N. Y.	1914
*Schweitzer, Ada E., M. D.	1265 College Ave., Indianapolis, Ind.	1913
Scott, Prof. Ernest, M. D.	715 North Park St., Columbus, Ohio	1912
Scudder, Miss Kate	620 Greenup St., Covington, Ky.	1915
*Scudder, N. C., M. D.	104 West Liberty St., Rome, N. Y.	1914
*Seabright, John E.	Address unknown	1913
Sears, F. W., M. D.	709 South Warren St., Syracuse, N. Y.	1914
Seavey, Minnie A., M. D.	1021 Tenth St., Sacramento, Cal.	1914
*‡Sedgwick, Prof. W. T.	491 Boylston St., Boston, Mass.	1902
*Seemann, W. H., M. D.	La. State Board of Health, New Orleans, La.	1913
**Selby, Clarence D., M. D.	412 Potter St., Toledo, Ohio	1914

SELIGMAN, ISAAC	1 William St., New York City	1915
*SELL, F. W., M. D.	102 Irwin St., Rahway, N. J.	1907
SEYMOUR, MISS GERTRUDE	105 East 22d St., New York City	1915
SEYMOUR, MAURICE M., M. D.	Regina, Sask.	1908
SHARP, MISS RUBY W.	1303 Twenty-Four and One-Half St., Rock Island, Ill.	1914
‡SHAW, G. H.	Bureau Animal Industry, Dept. Agriculture, Washington, D. C.	1914
SHAW, HENRY L. K., M. D.	361 State St., Albany, N. Y.	1914
SHEA, THOMAS B., M. D.	74 Marlborough St., Boston, Mass.	1900
SHEEHAN, W. J., M. D.	103 Westchester Ave., Port Chester, N. Y.	1915
SHERIDAN, GEORGE V.	1675 Franklin Ave., Columbus, Ohio	1916
SHERMAN, PROF. HENRY C.	Columbia University, New York City	1914
SHERMAN, WALTER J.	613 Nashby Bldg., Toledo, Ohio	1904
*SHIELDS, WILLIAM S.	1201 Hartford Bldg., Chicago, Ill.	1912
*SHIMER, WILLIAM, M. D.	122 State House, Indianapolis, Ind.	1912
SHINKLE, A. CLIFFORD	115 East 4th St., Cincinnati, Ohio	1914
SHIPLEY, ALFRED E., M. D.	111 Halsey St., Brooklyn, N. Y.	1915
SHOEMAKER, W. W.	Buffalo, N. Y.	1915
*| SHORE, C. A., M. D.	Holleman Bldg., Raleigh, N. C.	1909
SHOWALTER, R. W.	Eli Lilly & Co., Indianapolis, Ind.	1916
SHUMAN, GEORGE H., M. D.	618 North St. Clair St., Pittsburgh, Pa.	1914
SIEGMUND, HARRY B.	1918 Wilkens Ave., Baltimore, Md.	1915
‡SIMMONS, FREDERICK G.	353 Farwell Ave., Milwaukee, Wis.	1914
*SIMMONS, RICHARD H., M. D.	118 South 6th St., Shamokin, Pa.	1914
*SIMONS, GEORGE W., JR.	1075 Boylston St., Boston, Mass.	1914
SIMPSON, A. U., M. D.	508 Cobb Bldg., Seattle, Wash.	1916
SIMPSON, CHARLES G.	100 Holyrood Ave., Lowell, Mass.	1915
†SIMPSON, R. M., M. D.	702 Sterling Bank, Winnipeg, Man.	1906
SINCLAIR, MISS ALICE	261 William St., Belleville, Ont.	1915
SINGER, WILLIAM F.	114 West 9th St., Pueblo, Colo.	1913
‡SKINNER, JOHN F.	31 Somerset St., Rochester, N. Y.	1915
SKOOG, PAUL LEONARD	944 South 2d St., Springfield, Ill.	1914
*SLACK, ALBERT J.	Institute of Public Health, London, Ont.	1906
†SLACK, FRANCIS H., M. D.	51 Lincoln St., Hyde Park, Mass.	1905
SLATAPER, FELICIAN J., M. D.	Houston High School, Houston, Tex.	1915
*SLEE, ARTHUR M.	Swiftwater, Pa.	1913
SLEMONS, CLYDE C., M. D.	City Hall, Grand Rapids, Mich.	1915
SMEDLEY, ANDERSON L., M. D.	N. W. Corner 3d and High Sts., Hamilton, Ohio	1914
SMERSH, F. M., M. D.	Owatonna, Minn.	1899
†SMITH, CLARENCE E., D. V. S.	City Health Commissioner, Greenville, S. C.	1914
*SMITH, CLAUDE A., M. D.	City Hall, Atlanta, Ga.	1911
SMITH, CLYDE F.	Islington, Mass.	1915
†SMITH, C. MASON, M. D.	Prince Edward St., Fredericksburg, Va.	1913
SMITH, GARRET	95 Troup St., Rochester, N. Y.	1915
SMITH, GEO.	Health Officer, Manchester, Vt.	1916
SMITH, GEORGE H.	Glenolden, Pa.	1911
SMITH, JOHN ARCHIBALD, M. D.	41 Riverside Dr., Saranac Lake, N. Y.	1914
‡SMITH, J. WALDO	Municipal Bldg., New York City	1913
SMITH, KARL W., M. D.	Univ. of Wisconsin, Madison, Wis.	1912
†SMITH, R. MORTON, M. D.	Riverpoint, R. I.	1911
SMITH, WILLIAM W., M. D.	2111 Robinson Ave., Portsmouth, Ohio	1916
SMOOT, LLOYD D.	Engineers Bldg., Main and Orange Sts., Jacksonville, Fla.	1914

SMOCK, PROF. JOHN C.	Hudson, N. Y.	1899
SMYTH, FRANCIS R., M. D.	Bismarck, N. D.	1912
SNOW, WILLIAM F., M. D.	105 West 40th St., New York City	1909
SOLIS-COHEN, MEYER, M. D.	4102 Girard Ave., Philadelphia, Pa.	1915
‡SOPER, GEORGE A., M. D.	391 West End Ave., New York City	1900
SORKNESS, PAUL, M. D.	Edwards Bldg., Fargo, N. D.	1916
§SOUTH, DAVID S.	145 South Hanover St., Trenton, N. J.	1907
†SPALDING, HERMAN, M. D.	3117 South Park Ave., Chicago, Ill.	1900
SPAULDING, CHARLES H.	1401 South 4th St., Springfield, Ill.	1914
‡SPEAR, WALTER E.	250 West 54th St., New York City	1913
*SPERRY, JOEL A., 2d.	1004 West Oregon St., Urbana, Ill.	1914
SPINDEL, E. S., M. D.	Myers Bldg., Springfield, Ill.	1916
SPITZ, HERMAN, M. D.	308 Eve Bldg., Nashville, Tenn.	1915
SPRAGUE, JOHN TITCOMB, M. D.	514 Bay St., Stapleton, N. Y.	1915
SPRENGER, FRED. K.	Bronxville, N. Y.	1915
SPURR, JAMES HENRY	Experiment Station, Lawrence, Mass.	1915
STAGE, LOU E.	Bliss, N. Y.	1915
STAHR, CHARLES P., M. D.	City Hall, Lancaster, Pa.	1915
STEFFEN, CHARLES J.	459 Thirtieth Ave., Milwaukee, Wis.	1914
STEVENS, MISS NELLIE C.	725 South 3d St., Ocala, Fla.	1914
STEVENS, RICHARD	Hoboken, N. J.	1915
*STEVENSON, ALBERT F.	3915 Woodley Rd., Washington, D. C.	1913
‡STEVENSON, W. L.	6912 Ridge Ave., Philadelphia, Pa.	1912
STEVENTON, G. C., M. D.	City Hall, Youngstown, Ohio	1907
*STEWART, HENRY V.	11th and Bank Sts., Richmond, Va.	1914
STEWART, J. REVERDY	1515 You St., Washington, D. C.	1914
STEWART, PAUL M., M. D.	U. S. P. H. Service, Ellis Island, N. Y.	1916
STICKNEY, VICTOR H., M. D.	101 Sims St., Dickinson, N. D.	1915
STIDHAM, HARRISON	Wilkins Bldg., Washington, D. C.	1914
§STILES, PROF. CH. WARDELL	25th and E Sts., Washington, D. C.	1904
*STILES, GEORGE W., JR.	Tabor Opera House Bldg., Denver, Colo.	1909
STIMSON, ARTHUR M., M. D.	Hygienic Laboratory, Washington, D. C.	1914
*STINGILY, CLYDE R.	State Health Laboratory, Jackson, Miss.	1914
*†STOKES, WM. ROYAL, M. D.	Lab. State Health Dept., City Hall Annex No. 1, Baltimore, Md.	1899
*STONE, BINGHAM, M. D.	184 Church St., Burlington, Vt.	1900
†STONE, ELLEN A., M. D.	280 Waterman St., Providence, R. I.	1914
*STONE, MURRAY C., M. D.	523 Woodruff Bldg., Springfield, Mo.	1913
STONE, W. C., M. D.	Ellicott City, Md.	1915
STOREY, THOMAS A., M. D.	Coll. of the City of N. Y., New York City	1912
*STOVALL, WILLIAM D., M. D.	State Hygienic Laboratory, Madison, Wis.	1914
*STORY, ROBERT V.	1426 Carroll St., St. Louis, Mo.	1914
STOUMANN, KNUD	Prudential Insurance Co., Newark, N. J.	1915
*†‡STRAUS, PROF. AUBREY H.,	Dept. of Bacteriology, Med. Coll. of Virginia, Richmond, Va.	1909
STRAUS, NATHAN	33 West 42d St., New York City	1903
STRAUS, CHARLES	141 Broadway, New York City	1914
‡STREETER, H. W.	3d and Kilgour Sts., Cincinnati, Ohio	1914
STUART, EDWARD	American Red Cross, American Consulate, Nish, Serbia	1914
†SUMMERS, B. E., M. D.	City Hall, Richmond, Va.	1914
†‖SUMNER, GUILFORD H., M. D.	Capitol Bldg., Des Moines, Iowa	1913
SUPPLEE, GEORGE CORNESS, M. S. A.	407 College Ave., Ithaca, N. Y.	1915
SUTHERLAND, CHAS. H., M. D.	Janesville, Wis.	1915

*†§Swarts, Gardner T., M. D.	State House, Providence, R. I.	1894
Swarts, Gardner T., Jr., C. E.	70 Waterman St., Providence, R. I.	1915
*Sweet, Albert W., Ph. D.	Newport, R. I.	1913
Swingle, Prof. D. B.	702 South Grand Ave., Bozeman, Mont.	1915
Syle, Miss Josephine I.	439 West 4th St., Lexington, Ky.	1915
Sylvester, Ira W.	Alexandria, La.	1903
Szwajkart, Adam	3535 West Diversey Ave., Chicago, Ill.	1914
Talbert, C. M.	Room 322, City Hall, 12th and Market Sts., St. Louis, Mo.	1916
‡Talbot, A. N.	1011 West California Ave., Urbana, Ill.	1913
Talbot, Miss Marion	Green Hall, Univ. of Chicago, Chicago, Ill.	1893
*Tanner, Fred W.	Bacteriological Dept., Univ. of Illinois, Urbana, Ill.	1914
Tanner, Wallace J.	419 Second Ave., North, St. Petersburg, Fla.	1914
‡Tarbett, Ralph E.	3d and Kilgour Sts., Cincinnati, Ohio	1914
Taylor, Henry W.	109 State St., Albany, N. Y.	1915
Taylor, John R., M. D.	22 Prospect Ave., Madison, Wis.	1915
Taylor, Jos. E., M. D.	Gainesville, Fla.	1913
Taylor, Paul T.	105 East 22d St., New York City	1913
Taylor, William U.	P. O. Box 147, Moores, N. Y.	1915
*‡Tedeschi, Leon G., M. D.	3596 Wilson Ave., Cincinnati, Ohio	1909
Teimer, Theodor, M. D.	184 Clifton Ave., Newark, N. J.	1915
Tennessee Anti-Tuberculosis Association	323 Sixth Ave., North, Nashville, Tenn.	1914
*Tenney, Elmer S., M. D.	1st Lieut. M. R. P., Fort Barry, Cal.	1913
Terrell, Alan G.	22d St. near Griffin Ave., Riverhead, N. Y.	1915
Terrill, James J., M. D.	610 North 7th St., Temple, Tex.	1915
††Terry, C. E., M. D.	2601 St. Johns Ave., Jacksonville, Fla.	1910
Tetrault, Philip A.	Purdue University, Lafayette, Ind.	1914
†Tetreau, Thomas, M. D.	211 South 4th St., North Yakima, Wash.	1912
Thabault, George, M. D.	132 Main St., Winooski, Vt.	1916
Theriault, Emery J.	U. S. P. H. Service, Cincinnati, Ohio	1915
Thomas, Arthur H.	Haverford, Pa.	1913
*Thomas, James B.	920 North Carrolton Ave., Baltimore, Md.	1907
Thomas, Prof. Stanley Judson	Care H. K. Mulford Co., Glenolden, Pa.	1915
Thomson, Alec Nicol, M. D.	De Kalb Ave. and Raymond St., New York City	1916
Thomson, T. F., M. D.	City Health Board, Milwaukee, Wis.	1915
*‡Thomson, John T.	86th and Bartram Ave., Philadelphia, Pa.	1911
Thomson, W. F.	Perlstein Bldg., Beaumont, Tex.	1915
Thompson, O. P.	935 West 3d St., Waterloo, Iowa	1914
Thrash, Elmore C.	428 Chandler Bldg., Atlanta, Ga.	1914
*Tice, William G., B. Sc., Bureau Foods and Drugs, State Health Dept., Trenton, N. J.		1909
Tiffany, John L.	170 William St., New York City	1915
‡Tighe, J. L.	189 High St., Holyoke, Mass.	1910
*Tilley, F. W., M. D.	1311 Twenty-first St., North West, Washington, D. C.	1912
Tinkham, Henry C., M. D.	46 North Winooski Ave., Burlington, Vt.	1914
‡Tinsman, Joseph A.	2145 Derry St., Harrisburg, Pa.	1913
Tlusty, Anthony	202 Sixteenth Ave., West, Cedar Rapids, Iowa	1913
Tolles, Frank C.	265 South Columbus Ave., Mt. Vernon, N. Y.	1915
Tolman, Mayo	State Health Board, State Capitol, Charleston, W. Va.	1915
Tompkins, Geo. N., M. D.	Croton-on-Hudson, N. Y.	1915
†Torralbas, Frederico, M. D.	36 Tejadello, Havana, Cuba	1912
Torrance, F., M. D.	General Canadian Bldg., Ottawa, Ont.	1913
†§Trask, John W., M. D.	3 B St., South East, Washington, D. C.	1909

Traynham, A. P., M. D.	1110 Capitol St., Richmond, Va.	1915
Trembley, Charles C., M. D.	Saranac Lake, N. Y.	1915
Trost, Col. Sam. W.	12 West Canal St., Cincinnati, Ohio	1916
†§Tucker, George E., M. D.	Box 580, Riverside, Cal.	1912
Tucker, Henry, M. D.	14 Elliott St., Brattleboro, Vt.	1907
Tucker, William C., M. D.	156 Fifth Ave., New York City	1914
*‡Tully, Edward J.	State Laboratory of Hygiene, Madison, Wis.	1913
Turman, Alexander E., M. D.	17 West Grace St., Richmond, Va.	1909
‡Turner, Clair E.	Care Mass. Inst. Tech., Boston, Mass.	1915
Turstead, Hugh	604 Pillsbury Bldg., Minneapolis, Minn.	1914
**Tuska, Gustave R.	68 William St., New York City	1915
Tuttle, T. D., M. D.	930 Henry Bldg., Seattle, Wash.	1915
Twombly, Alex. H.	55 Liberty St., New York City	1914
Tyedt, Halpdan Samuel	39 West 38th St., New York City	1915
Underhill, Eliz. C., M. D.	South Hadley, Mass.	1911
Underhill, Fred T., M. D.	City Hall, Vancouver, B. C.	1915
Underwood, Wm. Lyman	Belmont, Mass.	1902
Utley, Herbert H., M. D.	Smithfield, N. C.	1914
‖Van Blarcom, Miss C. C.	30 North Michigan Blvd., Chicago, Ill.	1913
Van Blarcom, Dixon	1547 Jackson St., San Francisco, Cal.	1914
§Van Buren, George H.	2474 Ontario Rd., Washington, D. C.	1912
Van Buskirk, L. H.	40 East Northwood Ave., Columbus, Ohio	1915
Van Cleve, Edward M.	412 Ninth Ave., New York City	1916
*Van Densen, W. P.	3510 Architect Ave., North East, Minneapolis, Minn.	1914
Van Devrede, Miss Jane	801 Price St., Savannah, Ga.	1914
Van Dusen, Edmund C.	Franklin St., Athens, N. Y.	1915
Van Dusen, James Wallace	Major Medical Corps, care Surgeon General U. S. A., Washington, D. C.	1915
*Van Es, Louis	Agricultural College, Fargo, N. D.	1909
Van Hood, E.	Ocala, Fla.	1915
Van Ingen, Philip, M. D.	125 East 71st St., New York City	1914
Van Kleek, Miss Mary	130 East 22d St., New York City	1915
‡Vaughan, Henry F.	Detroit, Mich.	1914
§Vaughan, Milton, M. D., A. B.	City Hall, Little Rock, Ark.	1915
*†Vaughan, Victor C., Jr., M. D.	Kiesge Bldg., Detroit, Mich.	1909
Van Wagenen, Bleecker	443 Fourth Ave., New York City	1915
Van Winkle, Howard L., M. D.	N. Y. State Dept. Health Lab., Albany, N. Y.	1915
†Veiller, Lawrence	105 East 22d St., New York City	1910
Victors, Ernest A.	133 Geary St., San Francisco, Cal.	1915
Vinson, Willie J., M. D.	111 East Tarpon Ave., Tarpon Springs, Fla.	1914
†Vogelson, John A.	710 City Hall, Philadelphia, Pa.	1910
Von Wedel, Hasson	Von Wedel Laboratories, Dobbs-Ferry-on-Hudson, N. Y.	1915
Vosbury, W. De Witt	601 Market St., Camden, N. J.	1916
‡§Votey, Prof. J. W.	Burlington, Vt.	1909
*Wachter, Leonard M.	192 Partridge St., Albany, N. Y.	1906
Wade, Miss Ethel M.	State Health Board, Minneapolis, Minn.	1909
Wadsworth, Augustus B., M. D.	278 Bates St., Albany, N. Y.	1914
Wadsworth, D. U.	1121 South Main St., Tulsa, Okla.	1915
Wagenhals, H. H.	Marine Hospital, 3d and Kilgour Sts., Cincinnati, Ohio	1914

‡Wagner, Adolph	Old Dominion Land Co., Newport News, Va.	1912
Wagner, Edward L.	124 Willet St., Jamaica, Long Island, N. Y.	1914
*Waite, Prof. Herbert H.	2144 B St., Lincoln, Neb.	1913
*Waite, Willis W., M. D.	Box 63, El Paso, Tex.	1910
Wakeman, Bertis R.	Hornell, N. Y.	1915
Walcott, William W., M. D.	32 West Central St., Natick, Mass.	1915
Waldo, Richard H.	55 West 44th St., New York City	1913
‡Walker Prof. Elton D.	138 South Atherton St., State College, Pa.	1914
*Walker, John T. A.	17 Battery Pl., New York City	1912
Walker, Watson Frank	Sanitary Engineer, Detroit Board of Health, Detroit, Mich.	1915
‡Wall, Ed ward E.	5361 Berlin Ave., St. Louis, Mo.	1914
Wallace, William M.	634 Berwick Ave., Detroit, Mich.	1915
Walsh, James H., M. D.	780 Plymouth Ave., Fall River, Mass.	1915
Walsh, Thomas A.	81 Buena Vista Ave., Yonkers, N. Y.	1914
Walsh, Thomas P., M. D.	569 Main St., Middletown, Conn.	1915
Walton, James S., M. D.	136 Market St., Amsterdam, N. Y.	1915
Warren, B. S., M. D.	U. S. P. H. Service, Washington, D. C.	1912
Warren, George L., M. D.	77 Houston St., Newark, N. J.	1908
*Warren, Howard B.	965 Church St., Mobile, Ala.	1914
Ward, Herbert C.	379 Agnes Ave., Detroit, Mich.	1915
Warner, C. B., M. D.	Port Henry, N. Y.	1915
Warriner, Carlos E.	City Hall, Fort William, Ont.	1914
‡Waterman, Prof. Earle L.	619 Oakland Bldg., Lansing, Mich.	1914
**Watkins, J. A., M. D.	U. S. P. H. Service, Pittsburgh, Pa.	1915
Watson, Carl H.	Great Neck, Long Island, N. Y.	1916
Watson, Irving A., M. D.	Board of Health, Concord, N. H.	1881
†Watt, Harry F., M. D.	Ocala, Fla.	1914
Way, J. Howel	Waynesville, N. C.	1915
Wayson, N. E., M. D.	Hygienic Laboratory, U. S. P. H. Service, Washington, D. C.	1915
§Weber, J. J.	105 East 22d St., New York City	1915
‡Webster, George S.	4900 Penn St., Philadelphia, Pa.	1912
††Webster, Henry E., M. D.	309 Lyceum Bldg., Duluth, Minn.	1910
Webster, Richard O.	1625 Transportation Bldg., Chicago, Ill.	1916
Weinzirl, Prof. John	4144 Tenth Ave., North East, Seattle, Wash.	1906
*Weiss, John M.	3611 Broadway, New York City	1914
†Welch, Harry E., M. D.	412 Stamburgh Bldg., Youngstown, Ohio	1909
Weld, Ivan C.	1116 Connecticut Ave., Washington, D. C.	1914
Weldon, L. J.	521 Metropolitan Bldg., Denver, Colo.	1913
††Wells, Chester H.	Montclair, N. J.	1907
††Wells, William F., M. D.	Kiptopeke, Va.	1910
*Werner, Ray C.	State Health Board, Atlanta, Ga.	1911
*Wesbrook, Frank M.	198 Hastings St., West, Vancouver, B. C.	1897
*‡West, Francis D.	Grant Ave., Torresdale, Philadelphia, Pa.	1909
†West, William J., M. D.	1000 Grove Ave., Richmond, Va.	1909
Western Electric Co.	500 South Clinton St., Chicago, Ill.	1915
‡Weston & Brooker, Inc.	Palmetto Bldg., Columbia, S. C.	1914
‡Weston, Edmund B.	P. O. Box 1316, Providence, R. I.	1911
*‡Weston, Robert S.	14 Beacon St., Boston, Mass.	1896
†Whalen, Charles J., M. D.	25 East Washington St., Chicago, Ill.	1910
‡Wheeler, Mrs. W. M.	Women's Municipal League, 6 Marlboro St., Boston, Mass.	1911
*Wherry, Wm. B.	City Hospital, Cincinnati, Ohio	1914
‡Whinery, Samuel	95 Liberty St., New York City	1912

*‡	WHIPPLE, PROF. GEORGE C.	6 Berkeley Pl., Cambridge, Mass. 1899
‡	WHIPPLE, MELVILLE C.	212 Pierce Hall, Cambridge, Mass. 1915
*	WHITE, BENJAMIN, PH. D.	Otisville, N. Y. 1913
*	WHITE, COURTLAND Y.	1808 Diamond St., Philadelphia, Pa. 1912
‡	WHITE, JOSEPH H.	San. Engr. Bur. of Mines, Pittsburgh, Pa. 1913
	WHITE, REV. J. O.	501 East 3d St., Cincinnati, Ohio 1916
	WHITE, WILLIAM A.	14 Wall St., New York City 1888
	WHITE, WILLIAM C.	Bedford and Wandless Sts., Pittsburgh, Pa. 1913
†	WHITELAW, THOMAS H., M. D.	408 Third St., Edmonton, Alta. 1908
*‡	WHITTAKER, H. A.	State Health Laboratories, Minneapolis, Minn. 1907
	WHITTET, RUFUS	141 State House, Boston, Mass. 1915
*‖	WHITTIER, FRANK N., M. D.	161 Main St., Brunswick, Me. 1912
	WHITIN, FREDERICK H	27 East 22d St., New York, N. Y. 1915
‖§	WHITNEY, MISS JESSAMINE S.	Children's Bureau, Washington, D. C. 1907
	WHYLE, WM., M. D.	500 Second St., Watertown, Wis. 1904
	WIEDEMANN, H. E.	Chemical Bldg., St. Louis, Mo. 1916
	WILBER, THOMAS R.	930 Henry Bldg., Seattle, Wash. 1916
§	WILBUR, CRESSY L., M. D.	116 South Lake Ave., Albany, N. Y. 1907
	WILBUR, RAY L., M. D.	Sacramento and Webster Sts., San Francisco, Cal. 1915
	WILD, WILLIAM F., M. D.	State House, Lincoln, Neb. 1915
‖	WILE, IRA S., M. D.	230 West 97th St., New York City 1912
*	WILEY, HARVEY W., M. D.	1120 Woodward Bldg., Washington, D. C. 1901
*§	WILLCOX, WALTER F.	257 Goldwin Smith Hall, Ithaca, N. Y. 1909
*	WILLIAMS, ANNA W., M. D.	Research Laboratory, Foot East 16th St., New York City 1904
*†§	WILLIAMS, ENNION G., M. D.	R. F. D. 4, Richmond, Va. 1905
	WILLIAMS, HOWARD J., M. D.	720 Spring St., Macon, Ga. 1914
	WILLIAMS, HENRY T., M. D.	274 Alexander St., Rochester, N. Y. 1915
	WILLIAMS, JESSE L., M. D.	415 St. James Bldg., Jacksonville, Fla. 1914
§	WILLIAMS, LINSLY R., M. D.	State Health Dept., Albany, N. Y. 1914
	WILLIAMS, SHERMAN, M. D.	346 Metropolitan Bldg., Denver, Colo. 1913
	WILLIAMSON, NORMAN E., M. D.	1818 Price St., Berkeley, Cal. 1915
	WILLIS, ROYALL H., M. D.	205 Park Pl., Brooklyn, N. Y. 1915
	WILLS, F. A.	Wills-Jones Milk Co., Philadelphia, Pa. 1913
	WILSEY, W. J.	67 State St., Perth Amboy, N. J. 1914
	WILSON, DUNNING S., M. D.	121 West Chestnut St., Louisville, Ky. 1913
	WILSON, ERNEST L., M. D.	Bolton Landing, N. Y. 1915
	WILSON, JOHN S., M. D.	22 South Hamilton St., Poughkeepsie, N. Y. 1910
	WILSON, PROF. MARGARET B.	Hunter College, 68th and Park Ave., New York City 1915
	WILSON, ROBERT J., M. D.	549 Riverside Dr., New York City 1915
	WILSON, WILLIAM H.	41 Broad St., New York City 1915
	WINN, J. C., M. D.	North Titus St., Gilmer, Tex. 1916
§‡† *	WINSLOW, PROF. C.-E. A.	Yale University, New Haven, Conn. 1902
	WINSLOW, J. C.	State Pub. Health Labs., Univ. of North Dakota, Bismarck, N. D. 1914
‖	WINSLOW, PAUL V., M. D.	Poughkeepsie, N. Y. 1913
	WISCONSIN INDUSTRIAL COMMISSION	State Capitol, Madison, Wis. 1915
†	WODENHOUSE, ROBERT E., M. D.	22 Murray Bldg., Port Arthur, Ont. 1910
§	WOLF, JOHN G., M. D.	1145 Berkeley Ave., Pueblo, Colo. 1914
	WOLFF, ARTHUR J., M. D.	320 Collins St., Hartford, Conn. 1915
	WOMER, WM. ALEXANDER, M. D.	1112 South Mill St., New Castle, Pa. 1914
	WOOD, ALFRED V.	1777 Gloucester St., Brunswick, Ga. 1910
	WOOD, EDWARD J., M. D.	201 Chestnut St., Wilmington, N. C. 1915
	WOOD, EDWARD M., M. D.	River Ave., Winnipeg, Man. 1913

‡Wood, Harold B., M. D.	State Health Dept., Charleston, W. Va.	1909
‡Woodbridge, Prof. S. Homer	Mass. Inst. Tech., Boston, Mass.	1895
Woodhull, Gen. A. A.	Princeton, N. J.	1874
Woods, C. S.	Methodist Episcopal Hospital, Indianapolis, Ind.	1915
†Woods, F. A., M. D.	238 Maple St., Holyoke, Mass.	1914
†§Woodward, William C., M. D.	1782 Lanier Pl., Washington, D. C.	1896
*Woodworth, Elizabeth A., M. D.	3201 Clinton Ave., Minneapolis, Minn.	1911
Worthington, Samuel	79 Park Ave., Glen Ridge, N. J.	1914
†Wright, Frank W., M. D.	10 City Hall, New Haven, Conn.	1889
Wright, Prof. Jasper H.	Mechanics Institute, Rochester, N. Y.	1915
*Wright, John Henry	39 West 38th St., New York City	1914
†Wright, J. W., M. D.	247 West 8th St., Erie, Pa.	1897
†Wrightson, James T., M. D.	2 Walnut St., Newark, N. J.	1914
§Wyman, S. W., M. D.	139 Centre St., New York City	1915
Youmans, Miss Iva Catherine	1404 Walnut St., Jacksonville, Fla.	1914
§Young, Albion J., M. D.	State House, Augusta, Me.	1913
Young, Anna R., M. D.	Presbyterian Hospital, 41 East 70th St., New York City	1912
**Young, Augustus A., M. D., B. S.	22 East Miller St., Newark, N. Y.	1915
Young, Mrs. C. A.	604 Fifth Ave., Asbury, N. J.	1906
*‡Young, Clifford C.	State Water Supply, Lawrence, Kan.	1912
Young, C. T.	Plant City, Fla.	1915
Young, George B., M. D.	Norfolk, Va.	1910
Zetek, James	Box 245, Ancon, C. Z.	1915
Ziegler, Carl, M. D., B. S. G.	2362 Wheeler St., Cincinnati, Ohio	1916
‡Zimmele, George B.	3301 Mt. Vernon Ave., Milwaukee, Wis.	1914
Zimmerman, Samuel A., M. D.	707 Euclid Ave., Valley City, N. D.	1915

HONORARY MEMBERS

Eastman, George	Rochester, N. Y.	1910
Gorgas, William C., M. D., D. Sc., LL.D.	Washington, D. C.	1901
Holton, Henry D., A. M., M. D.	Brattleboro, Vt.	1875
Liceaga, Eduardo, M. D.	2ª de Napoles, numero 37, Mexico City	1891
Mills, Dudley A., Lt. Col.	Royal English Office, Channel Isle, Jersey, England	1905
Montizambert, Frederick, M. D.	Ottawa, Ont.	1885
Preciado, Alfonso, M. D.	Panama, Panama	1904
Russell, J. B., M. D.	Glasgow, Scotland	1886
Sifton, Clifford	Ottawa, Ont.	1910
Smith, Stephen, M. D., LL.D.	New York City	1872
Taft, Prof. William Howard	New Haven, Conn.	1910

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